

March 9, 2009

Mr. Eric Ebersberger  
Natural Resources Program Manager  
Wisconsin Dept. of Natural Resources  
101 S Webster Street - DG/5  
Madison, WI 53703

RE: March 3, 2009 Correspondence  
Response to Request for Additional Documents

Dear Mr. Ebersberger:

We are hereby providing our response to the questions and comments raised in the referenced correspondence. We have provided the original question or comment followed by our response.

*RE: Amended Sample Application for Straddling Community Water Diversion Volume 1*

1. *According to Table 3 'Residential Water Demand: 1979-2005', which is derived from New Berlin's own data, the per capita residential water use in the City of New Berlin in 2005 is 89 gallons per day, yet the application (p. 10, 4<sup>th</sup> par.) cites a SEWRPC study that found the residential per capita water use to be 58.5 gallons per day. Please explain this discrepancy.*

The data sets that were used in each case were different. For the information in the table 3 we used the Public Service Commission Annual Report which provides the number of customers by customer class and the total metered sales for the class as a whole. This includes only single family and duplex buildings. We then used the Waukesha County estimates of household population density to determine per capita water use for this customer class.

SEWRPC arrived at their per capita water use figure in a different manner. They use the most current and accurate population data by 1/4, 1/4 section and made an allowance for multi-family buildings. When an estimated water demand by multi-family is added on to the residential demand class and then divided by the total population, a more accurate, and lower per capita number was obtained. In the case of projecting water future water demands by customer class, the higher number (89) was used by R/M. SEWRPC, in their work, projected future water demands by population projections and therefore it was appropriate for them to use the lower figure. In fact, the final regional water supply plan by SEWRPC used a composite figure of 70 gpcd based upon a review of the entire region over a number of different years.



Letter to Mr. Eric Ebersberger  
Natural Resources Program Manager  
Wisconsin Dept. of Natural Resources  
March 9, 2009  
Page 2

2. *The application (p. 18, last par.) suggests that the utility would be reviewing additional conservation measures and would recommend further actions to achieve greater conservation and efficiency. Please provide an updated discussion of the most current water conservation and efficiency plan currently being implemented in the City, including an assessment of the program's effectiveness.*

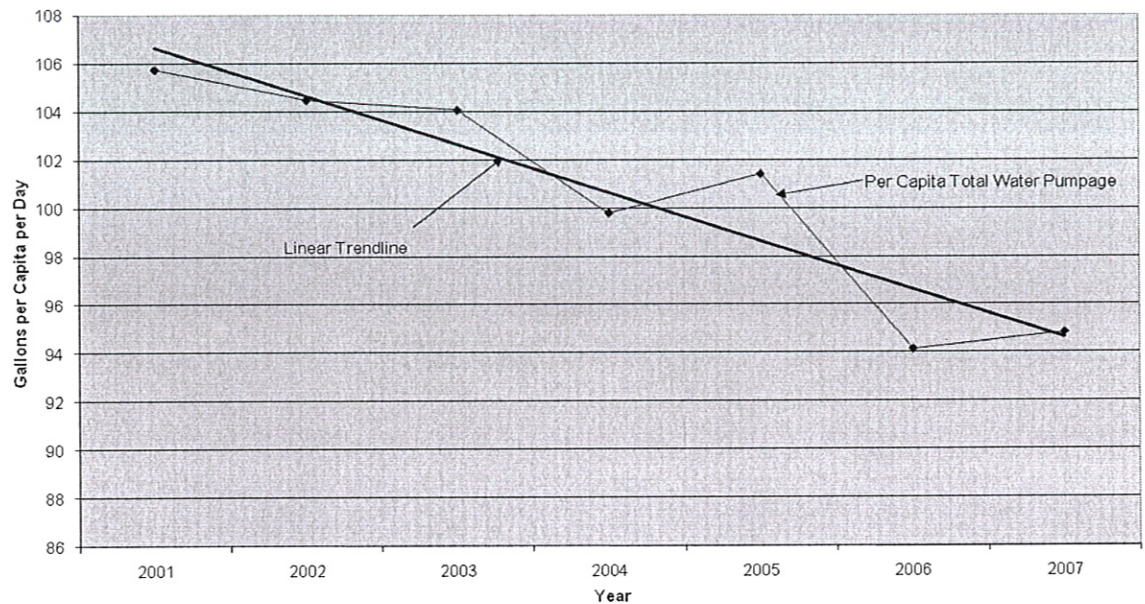
The City of New Berlin is in the process of preparing a Water Conservation Plan. That plan, in draft form, is attached in Appendix A and dated July, 2008. While this plan is in draft format, the City is actively meeting at the committee level (next meeting March 12, 2008) and expects to finalize the plan over the next 6-9 months. One component that the plan does not currently include is conservation water rates. The City is currently going through a rate case because of the anticipated conversion to all Lake Michigan water. When that rate case is completed, the City will be undertaking a review of the need for and potential benefits of conservation rates. Attached in Appendix A is an excerpt from meeting minutes from the New Berlin Utility Committee meeting of September 23, 2008. This shows the Committee's willingness to deal with conservation issues in a more aggressive manor following completion of the Lake Michigan water project.

With regard to the assessment of the program's effectiveness, the following chart shows the per capita total water use in New Berlin from 2001 to 2007. 2001 is when the utility began the conservation efforts with sprinkling restrictions. Per capita total water use is determined by dividing the total annual pumpage from all sources by 365/366 days and then by the estimated population served. The estimated population served was obtained by using SEWRPC's 2000 and 2005 estimated population served by water and using a straight line progression for the years in between. For 2006 and 2007, estimates of additional population were made based upon increases in residential customers and regional household density figures.



Letter to Mr. Eric Ebersberger  
Natural Resources Program Manager  
Wisconsin Dept. of Natural Resources  
March 9, 2009  
Page 3

**Figure 1**  
**Per Capita Total Water Pumpage: 2001-2007**  
**City of New Berlin, Wisconsin**



There are several plausible reasons for this decrease in use and most likely, the decrease is a result of a combination of the following:

- Decreases due to sprinkling restrictions.
- Decreases resulting from the water conservation education program at the City.
- Decreases resulting from recent rate increases in both sewer and water rates.
- Decreases resulting from the abandonment of water softeners in areas already served with lake water.
- Decreases in water loss from the operation of wells (production water).

SEWRPC predicted a reduction in water use of 4 percent for average day demand and 6 percent for a maximum day demand over and above the current level of conservation, in the regional water supply study. This is for communities that use Lake Michigan water and have adequate infrastructure for the next 10 years. We



Letter to Mr. Eric Ebersberger  
Natural Resources Program Manager  
Wisconsin Dept. of Natural Resources  
March 9, 2009  
Page 4

believe this is an accurate prediction of New Berlin's future situation. A copy of Table IV-9 from the Draft SEWRPC report is attached in Appendix A.

3. *Also please explain the discrepancy between the reference on p. 20 indicating that 641 million gallons of water was pumped from Lake Michigan to in-basin customers in 2006, and the annual report from Milwaukee Water Works (as submitted to the PSC), which indicates they only sold 479 million gallons in that period. (The volumes match up much closer in subsequent years.)*

We researched the discrepancy and discovered that the accounting by the City of New Berlin for annual PSC reports did not take into account that Milwaukee reports in 100 cubic feet and New Berlin reports in 1000 gallons. The accurate figure for 2006 pumpage by New Berlin, as metered by New Berlin and adjusted is 481,105,640 gallons. New Berlin has corrected it's reporting process.

4. *The information summarized in Table 9 (p. 22) is derived from water use information from 2005. Please update this information using the most recent water use and sewage flow data available. Further, rather than extrapolating the City's water needs only to the year 2050, the application must also include a 20-year projection of the pumpage and sewage flows to coincide with the planning period covered by the Water Supply Service Area Plan.*

The information on Table 9 has been updated for year 2029. We are using the most recent, available sewerage flow data. Data has not been compiled for 2008. Data for 2007 complete for only 9 months. Data for 2006 and 2007 includes many periods where flow monitors were out of service. 2005 is the best annual information the City currently has. The water and sewerage projections are based upon the most recent projections of water use and a smaller (recently identified) proposed service area. The data is contained in Appendix B.

5. *Additionally, please indicate what the City will do with the existing wells. Identify which of the wells will be permanently filled and sealed, which will be temporarily abandoned, and which may be used with some regularity. Also, for each well indicate whether it is located in the Mississippi River Basin or the Lake Michigan Basin and whether the well is within the water supply service area.*





Letter to Mr. Eric Ebersberger  
Natural Resources Program Manager  
Wisconsin Dept. of Natural Resources  
March 9, 2009  
Page 5

Ultimately, the City will abandon all existing wells according to administrative code requirements. For the first five years the plan for the existing wells is as follows:

- Well No. 1 – Already abandoned.
- Well No. 2 – Maintain well and test pump monthly. Sample regularly on a schedule agreed upon with the department.
- Well No. 3 – Maintain well and test pump to waste monthly. Sample regularly on a schedule agreed upon with the department.
- Well No. 4 – Already abandoned.
- Well No. 5 – Deep well with high radium will be abandoned.
- Well No. 6 – Already abandoned.
- Well No. 7 – Maintain well and test pump to waste monthly. Sample regularly on a schedule agreed upon with the department.
- Well No. 8 – Maintain well and test pump to waste monthly. Sample regularly on a schedule agreed upon with the department.
- Well No. 9 – Maintain well and test pump monthly. Sample regularly on a schedule agreed upon with the department.
- Well No. 10 – Maintain well and test pump monthly. Sample regularly on a schedule agreed upon with the department.
- Well No. 11 – Already abandoned.

The reason for maintaining the wells for the first five years is related to the level of service from Milwaukee. Milwaukee water is in the process of updating and reinforcing its supply capabilities within their system that serves New Berlin. These updates may take a year or two to complete. New Berlin desires to have available reliable back-up during these upgrades and a reasonable period to evaluate the available supply and redundancy once the improvements are complete. Actual pumpage from wells is expected to be limited to 10 minutes or so per month from each well. An estimated total annual quantity pumped is 630,000 gallons.





Letter to Mr. Eric Ebersberger  
Natural Resources Program Manager  
Wisconsin Dept. of Natural Resources  
March 9, 2009  
Page 6

After the five year period and assuming the wells can all be abandoned because of the strength of the Milwaukee supply, wells will be abandoned in the order of No. 3, No. 7, No. 2, No. 10, No. 8 and No. 9.

All wells are within the water supply service area. Wells No. 1, No. 4 and No. 11 were located in the Great Lakes basin and abandoned. Wells No. 8 and No. 9 are active and in the Great Lakes basin. Wells No. 3, No. 5, No. 7 and No. 10 are active and in the Mississippi River basin.

RE: Water Supply Service Area Plan, Dated February 11, 2009

1. *There is a general lack of information on volumes that are currently pumped from wells, and current volumes of purchased water from Milwaukee. Please submit the following information in graphical form, for each well (including those that were abandoned within the past 5 years), for purchased water and for any anticipated future wells that may be necessary:*
  - *X axis, years, starting five years ago and extending up to 20 years into the future (2004 to 2029)*
  - *Y axis, volume pumped each year, both past and anticipated.*
  - *A trend line of the volume actually pumped each year for past years.*
  - *For future years, two trend lines should be drawn. One showing the anticipated volume if the diversion is approved and the other depicting the projected volume if the diversion is not approved. For the wells, this should consider current aquifer conditions and aquifer drawdown trends which may limit or reduce future attainable pumpage from a particular well. There could be two predicted trends under the diversion-not-approved scenario, where one trend line allows the pumping level to extend below the overlying confining layer and another trend line that limits pumping level in the well to no deeper than the depth of the overlying confining layer.*
  - *If the anticipated life of a well is less than 20 years into the future, the graph should show approximately when that well would be taken out of service and pumpage would fall to zero. The graphs should be based solely on quantity available, not on water quality issues unless water treatment is not practicable for the water from a given well. The anticipated trend lines for each well should however show anticipated pumpage schedules based on when treatment systems would be installed if the diversion is not approved.*



Letter to Mr. Eric Ebersberger  
Natural Resources Program Manager  
Wisconsin Dept. of Natural Resources  
March 9, 2009  
Page 7

- *Assuming that additional well(s) may be needed if the diversion is not approved, include an additional graph(s) representing an additional yet-to-be-sited well(s) and the anticipated pumpage over time from that well(s).*
- *The above should be based on predicted changes in population.*

We have reviewed information provided by the City of New Berlin regarding metered pumpage from all City wells and Lake Michigan pumping stations. This information is based upon SCADA system monitoring of water meters at well pumping stations and Lake Michigan water pumping stations. It appears that on reports submitted to the Public Service Commission for the years 2005 – 2007, the conversion from 100's of cubic feet to 1,000's of gallons was not made for the Milwaukee supplied water. The tables and figures attached in Appendix C represent corrected values.

Figure C-1 and Table C-1 in Appendix C provide historic and estimated well pumpages if Lake Michigan water is not diverted. Figure C-2 and Table C-2 in Appendix C estimate pumpages from wells if water is diverted. As previously mentioned, we do not anticipate using the wells more than 5 years into the future. From the day the diversion starts, we will only pump the wells 10 minutes each month to collect samples and verify operation.

Appendix C also contains the projections of increased drawdown in the southeastern Wisconsin Region based upon the regional aquifer model created under a project administered by SEWRPC. Additional drawdown's in the sandstone aquifer of 100 feet by the year 2020 can be expected if existing wells in the region are maintained. The sandstone aquifer is a regional aquifer so it must be reviewed regionally and not on a well by well basis.

The potential of increasing drawdown over current levels are numerous. All current sandstone wells as of 2000 and later have experienced unconfined pumping conditions where pumping levels, and often static levels, are below the base of the Maquoketa Shale confining unit. Potential negative effects of this situation include:

- Pump setting depths will continue to get deeper. This not only increases cost to adjust the pump setting but also will eventually increase material costs for stronger pipe, joints and seals. Energy cost to pump the water will increase as well.





Letter to Mr. Eric Ebersberger  
Natural Resources Program Manager  
Wisconsin Dept. of Natural Resources  
March 9, 2009  
Page 8

- For the sandstone wells the casing extends to the bottom of the Maquoketa Shale confining unit and beyond. Water levels are below the casing in all wells exposing areas of the formation to air that historically have never been exposed. Experience with this type of situation in other areas of the state (the Fox Valley) have shown increased levels of arsenic and other metals. There is a distinct possibility this will occur here as well.
- Exposure of formation to air has the potential to increase bacterial growth of aerobic bacteria. This occurred under similar conditions at nearby Waukesha Well No. 9.
- Declining levels may allow lower depth portions of the aquifer, under lower heads, to contribute larger quantities of high TDS, high temperature, or increased radium, to the well. This has happened already in both New Berlin Well No. 8 and Waukesha Well No. 9.
- Declining levels also mean declining hydrostatic head. In component areas of the formation, collapse may occur due to less head to hold the drill hole open.

The current number and capacity of the wells appears to be adequate for the planning period, barring any significant unexpected changes. No new wells should be required.

If for unforeseen reason the diversion were not approved, the City would immediately bid out 3 wells treatment projects and following award, construct the treatment facilities. The total process from start to operation will take 10 – 12 months to complete.

2. *It is unclear what the requested diversion volume is (MGD), both maximum and average, and potential changes over time. Ideally, we'd like to see a graph that represents this.*

The anticipated amounts of the diversion are provided in Appendix D. Table D-1 provides the anticipated average day and peak day diversions by year. Actual amounts may vary due to weather conditions, emergencies (main breaks, etc.), and other factors not known at this time. The amount of water diverted is not anticipated to ever exceed the amount of water returned to the basin via sanitary sewerage system flows. Agreements in place with Milwaukee do not allow for future water service without return flow. The same information is presented graphically on Figure D-1.





Letter to Mr. Eric Ebersberger  
Natural Resources Program Manager  
Wisconsin Dept. of Natural Resources  
March 9, 2009  
Page 9

We trust this information and information in Appendices A through D adequately address your questions and comments.

Please call with questions.

Very truly yours,

RUEKERT/MIELKE

Steven H. Schultz, P.E.  
Principal/Water Supply & WTF Department  
Head

SHS:tag  
Enclosures

cc: Mayor Jack F. Chiovatero  
Kenneth Harenda, II, Alderman  
Rick Johnson, Utility Manager  
File

# Appendix A

# City of New Berlin Water Conservation Plan



Gregory W. Kessler  
Director  
Department of Community Development  
July 2008



**TABLE OF CONTENTS**

Key Statistics ..... 1

Introduction .....

Purpose of the Plan .....

Current Regulations & Activities .....

Evaluation of Historical Water Usage  
and Past & Current Conservation Measures .....

Land Use Planning, Stormwater  
Management and Development Review Measures ....

Conservation Measures .....

Program Actions .....

Incentive Program for Residents .....

Appendix A – Groundwater Cycle .....

Appendix B – Resources .....

---

## KEY STATISTICS

- ⇒ The population of the U.S. is anticipated to increase by 53 million people by 2020.
- ⇒ Ninety percent of all drinking water in the U.S. is pumped from groundwater supplies and most communities have witnessed falling water tables – use is exceeding the recharge rate.
- ⇒ Global warming forecasts foresee steadily increasing temperatures worldwide, with more extreme storms, increased drought in some locations and increased flooding in others.
- ⇒ Landscape irrigation accounts for approximately 51 percent of all domestic water consumption in the U.S.
- ⇒ There is a high level of variability in per capita water consumption between municipalities in comparable climatic zones (e.g., in 2005 the average single-family residential water consumption in Tucson, AZ was 114 gpcd compared to 174 in Las Vegas, NV) indicating the potential for more efficient consumption patterns.
- ⇒ Does your faucet drip? That drip is costing you money: 60 drops per minute equals 192 gallons per month; 90 drops per minute equals 310 gallons per month; and 120 drops per minute equals 429 gallons per month.
- ⇒ Old washers average 40.9 gallons per load vs. higher efficient models that use 24.3 gallons per load.
- ⇒ The most domestic water use can be attributed to the use of a toilet (26.7%), then your clothes washer (21.7%), shower (16.8%), faucet (16.7%), leak (13.7%), other domestic (2.2%), bath (1.7%) and dishwasher (1.4%).

Source: Rocky Mountain Land Use Institute, California Urban Water Conservation Council, [www.h2ouse.org](http://www.h2ouse.org) and the New Berlin Utility Department.

---

## **WATER CONSERVATION PLAN MISSION STATEMENT:**

To promote water conservation and protection measures throughout the City of New Berlin to ensure a viable and healthy water supply for future generations.

### **Goals:**

- Reduce overall water consumption.
- Enact water protection/conservation ordinances and codes.
- Protect wellhead recharge areas.
- Provide incentives for water conservation.
- Promote 3-Dimensional (groundwater, stormwater and surfacewater) water management.
- Implement good storm water BMP's that enhance recharge areas.

## **INTRODUCTION**

This document presents the City of New Berlin, Wisconsin ("City") Water Conservation Plan. Over the years, the City has conducted numerous water supply studies as well as the Southeastern Wisconsin Regional Planning Commission (SEWRPC). All of these studies are referenced in one form or another throughout this document.

New Berlin is uniquely positioned within southeast Wisconsin as it straddles the "Sub-Continental Divide", which runs north-south through the eastern part of the City. Nearly 27 square miles in the western part of the City, or about 73 percent of the City's total land area, is located in the Fox River Watershed. This portion is west of the Sub-Continental Divide and is part of the Mississippi River Watershed. The remaining City land area is tributary to the Great Lakes / St. Lawrence River drainage basin.

The majority of the City's present source of water supply consists of nine drilled wells. The groundwater that is acquired from these wells is found in two distinct water bearing geologic formations or aquifers. A third aquifer also exists in the area and may be an important aquifer for future use. A small portion of the east side of the City is supplied with water from the City of Milwaukee (Lake Michigan). This portion of the City is east of the sub-continental divide and wastewater from these homes is returned to Lake Michigan via the Milwaukee Metropolitan Sewerage District sewer system.

The following excerpts from the "Lake Michigan Water Supply Study" by Ruekert & Mielke further describes these aquifers. "The first of the three aquifers consists of the unconsolidated sand and gravel layers that lie on top of the bedrock. The extent and thickness of these layers do not provide significant groundwater yields in all areas. Sand and gravel deposits suitable for use as aquifers for municipal wells are difficult to locate. The thickness of the unconsolidated material underlying varies throughout the City."

New Berlin is located within Waukesha County, one of the fastest growing counties within the southeast Wisconsin region. The County's population in 2005 was 377,348. New Berlin is the sixth largest city in terms of land area in the state and the third most populated municipality in the County with a 2005 population of 38,969. Population trends for New Berlin indicate an approximate two to three percent increase in five year increments out to 2020. At that point in time, the estimated New Berlin population is expected to be 42,228. The City has experienced steady, moderate growth over the past 20 years.



There are two City departments that are involved with water conservation and water resource protection, they include the Water Utility and the Department of Community Development.

*The Mission of the Water Utility is to be the responsible custodian for and to provide a good quality, potable water supply at adequate pressures and in sufficient quantity for consumption and fire protection purposes, to all current and future Utility customers consistent with State/Federal Regulations and water industry practices and standards, in the most cost effective manner possible, and to educate the public about the benefits of being a good water use steward.*

*The Department of Community Development promotes and maintains the careful development of land, and preservation of the natural resources in the City of New Berlin. To accomplish this, the Department is involved in both current and long-range land use planning, engineering, building and capital improvement planning. This Department regulates every aspect of the development/construction process. DCD reviews, documents, permits, regulates and inspects all development/construction activity in the city. These efforts include reviewing and documenting development, economic development, geographic information systems (GIS)/land information systems (LIS), zoning enforcement, building inspection, construction/field inspections for new development, capital planning, mapping and in-house capital project design. It also includes the dissemination of this information to the public, working and coordinating with county, regional, state, and federal officials.*

### *Water Resources Management Utility Mission Statement*

## **PURPOSE OF THE PLAN**

The City has developed a Water Conservation Plan in order to be good stewards of a finite resource and thus its loss can impact the quality of life for residents but can dramatically affect policy decisions. In order to maintain quality of life and economic activity, a sustainable water supply is needed. To be good stewards, the City should conserve water by working closely with all residents and businesses to promote water conservation, and work with other governmental jurisdictions in the region to effectively manage water resources.

To this end, the City views water resource management three-dimensionally. That is the protection & management of our groundwater, surface water and storm water through various means and methods. The City has set the following Plan goals to promote this three-dimensional water resource management program:

- ⇒ Evaluate current water usage
- ⇒ Evaluate past & current conservation measures for the Water Conservation Plan as well as define new measures.
- ⇒ Determine resource levels for the water conservation program
- ⇒ Develop priorities
- ⇒ Improve baseline information on City water usage – update annually
- ⇒ Evaluate current regulations and determine if changes are necessary

### Overall Goals for Water Conservation

- ⇒ Reduce community per capita water use while retaining attractive landscapes
- ⇒ Enable the City to meet future needs of our growing population

- ⇒ Protect ground and surface water supplies from unsustainable depletion
- ⇒ Eliminate unnecessary waste in water use practices
- ⇒ Reduce wastewater treatment volume and associated municipal expenditures
- ⇒ Promote the increased use of harvested and recycled water for irrigation needs through the use of cisterns where appropriate for commercial and industrial development. See appendix on rain harvesting.

Much of this Plan was developed by referencing the numerous water studies and current, relevant industry materials that are available. According to our Department's records, twenty-two (22) studies at a cost of over \$200,000 have been conducted analyzing and studying water issues in New Berlin. Please see Appendix B for a comprehensive list of studies. This does not include the current ongoing work related to the redevelopment of the New Valley Sand & Gravel quarry site (Mill Valley Business Park). There will be a geo-technical component to that report. A list of recent water studies conducted for New Berlin is listed in Appendix B: **[MOVED LIST TO AN APPENDIX]**

### **WISCONSIN'S GREAT LAKES COMPACT**

The Great Lakes Basin is comprised of Lake Erie, Lake Huron, Lake Michigan, Lake Ontario, Lake Superior and the St. Lawrence River – represented by eight (8) Great Lakes states and two (2) Canadian Provinces (Minnesota, Wisconsin, Illinois, Indiana, Ohio, Michigan, Pennsylvania, New York, Quebec and Ontario). The Compact, in and of itself is significant as it encompasses ten (10) jurisdictions across international boundaries that have collectively agreed to manage the largest surface freshwater resource in the world. This is the first multi-jurisdictional agreement of this type in the world.

Each state and/or province must adopt identical statutes further implementing the Compact within their respective jurisdictions. The Wisconsin Legislature adopted Act 227 in early 2008. Governor Doyle signed the law into effect on May 27, 2008. Wisconsin Act 227 adopts text of the Compact into state statute and provides implementation provisions for both pre and post Compact. In summary, Act 227 now regulates:

- ⇒ "Interbasin Transfers" Prior to Compact Adoption;
- ⇒ New Statewide Water Supply Planning for Public Water Supply Systems;
- ⇒ New Statewide Water Use Regulations & Reporting System;
- ⇒ New In-basin Water Use Permitting System; and
- ⇒ New Water Conservation and Efficiency Program

As a complimentary document to Wisconsin Act 227, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) has prepared a Regional Water Quality Management Plan. The plan was completed in 2008. Please reference the SEWRPC website via the following link to review the complete plan <http://www.sewrpc.org/waterqualityplan/chapters.asp>. The scope of this plan is as follows:

- ⇒ Forecast future water use demand in the Region;
- ⇒ Consider potential of water conservation to reduce future demand;
- ⇒ Identify groundwater recharge areas which should be protected from development;

- ⇒ Assess potential for shallow groundwater recharge through infiltration of stormwater runoff and treatment plant effluent;
- ⇒ Consider potential alternative sources of supply;
  - Shallow groundwater;
  - Lake Michigan water replacing groundwater east of the sub-continental divide;
  - Lake Michigan water replacing groundwater in “straddling communities” which already have “return flow”;
  - Lake Michigan water replacing groundwater in “straddling communities” and “communities in straddling counties” and providing for “return flow”;
- ⇒ Estimate costs and impacts of alternatives;
  - Groundwater-Surface Water Interdependence and Impacts;
- ⇒ Identify any development constraints necessary to assure water supply sustainability; amend regional land use plan if necessary.

The Regional Water Supply Plan has identified and evaluated seven (7) different scenarios for providing adequate and clean water supplies to the region. It is important that this Plan be used as a guide as future water resource planning and conservation policy decisions are made.

### **CURRENT REGULATIONS AND ACTIVITIES**

Current development standards, regulations and activities are already being implemented within in the City. The goal of this plan is to expand on the current City actions and implement additional water conservation strategies. Below is a list of current City initiatives

:

- Codes/ordinances – numerous City regulations are in place to protect water quality and quantity. These ordinances follow DNR requirements for stormwater management. An ordinance regulating water use could be suggested to limit water usage by residents.
- Sprinkling restrictions – the Utility Department has enacted sprinkling restrictions for residents to follow year-round. The restrictions are as follows: even numbered addresses water on even days of each month and odd numbered addresses water on odd days of each month. Residents are also asked to refrain from watering during the hours of 4:00 and 8:00 PM.
- Utility activities – the Utility Department utilizes the City webpage to provide information to residents. The webpage includes information on water conservation, kids activities to learn more about water, a water drip calculator and sprinkling restrictions. The Utility Department has also placed informational articles in the City’s “Leaflet” quarterly newsletter, and has included conservation techniques in the City’s Annual Water Quality Report. The department also offers free “leak test” for customers to have their toilets or water softeners tested for leaks.
- Development/land use regulations – The Department of Community Development encourages low-impact development techniques when reviewing projects. The Zoning Code has minimum open space requirements to limit the amount of impervious surface on development sites. Alternative stormwater best management practices (BMPs) that use vegetation to naturally infiltrate the ground are also encouraged.



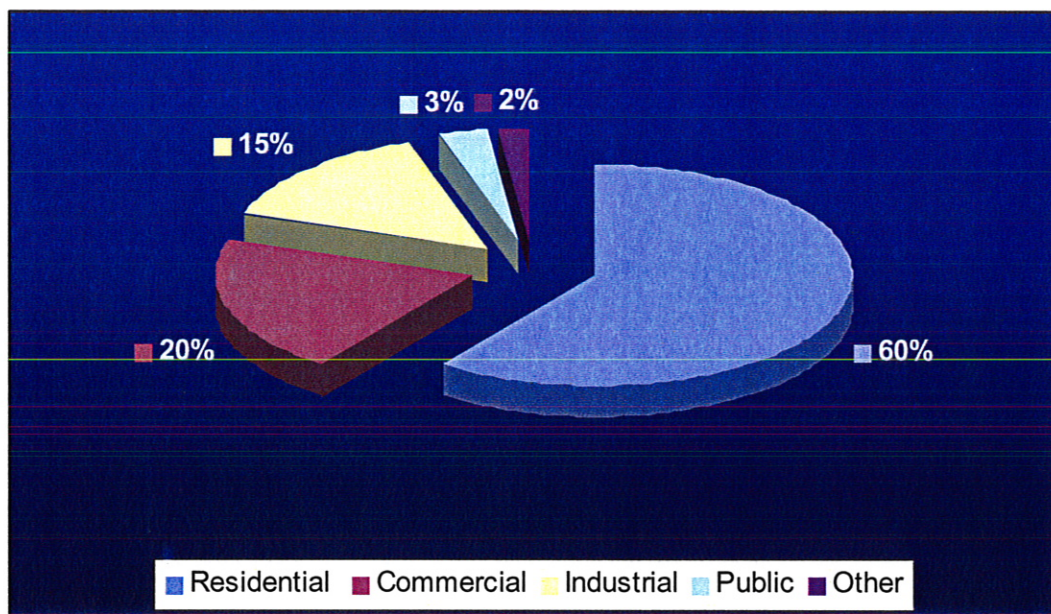
- Wellhead protection – the City also has a Wellhead Protection Area in the southeast portion of the City. This area is important to groundwater recharge and regulations are in place to protect the groundwater in this area.
- 3-D Stormwater regulations (groundwater, surface water and stormwater) – the City's ordinances and codes are in place to protect the City's water resources. The regulations work to promote protection of groundwater, surface water and stormwater. The DNR regulates many activities surrounding these resources and the City's regulations adhere to the DNR requirements. Currently the City has a stormwater management ordinance (Ord. #2193) to set stormwater management requirements, an erosion control ordinance (Ord. #2268) to prevent erosion from construction sites and a post-construction stormwater management ordinance (Ord. #2267) to prevent erosion for the long-term after construction. The City also has an illicit discharge ordinance to prevent and remedy any illegal discharges to the storm drain system. The Wellhead Protection area is in place to protect groundwater recharge areas.
- Public awareness/education – the City utilizes the website, "Leaflet" newsletter and mailing inserts to promote water conservation and protection. See the above section regarding the Utility Department's activities.
- SEWRPC RWQMP – the City will review and consider the recommendations in this plan to further protect water resources in New Berlin. SEWRPC has put an enormous amount of resources and knowledge into the creation of this plan and the information will be very valuable to the City.

### **EVALUATION OF HISTORICAL WATER USAGE AND PAST & CURRENT CONSERVATION MEASURES**

In 2004, the breakdown, by use, for City Water Utility customers is as follows:

|               |     |
|---------------|-----|
| ⇒ Residential | 60% |
| ⇒ Commercial  | 20% |
| ⇒ Industrial  | 15% |
| ⇒ Public      | 3%  |
| ⇒ Other       | 2%  |





Source: New Berlin Water Utility

According to numbers provided by the City's Water Utility Department, the total yearly pumpage from the City's seven (7) wells was:

- ⇒ 2005 894,117,000 million gallons
- ⇒ 2006 650,500,000 million gallons
- ⇒ 2007 663,726,000 million gallons

The peak pumping days for the last three years were:

- ⇒ 2005 5.76 Million Gallons (DATE????)
- ⇒ 2006 3,036,000 Million Gallons (August 2<sup>nd</sup>)
- ⇒ 2007 3,146,000 Million Gallons (July 25<sup>th</sup>)

Source: New Berlin Water Utility

There currently is not a mechanism in place to track water consumption by public water utility customers, but estimates show that the average residential water use per residential customer in New Berlin is approximately 230 gallons per customer per day (gpcd).

New Berlin has moved ahead with its water conservation measures whether it be through promoting and/or limiting water usage or through land use planning, stormwater management and development review. The activities implemented to date include:

- ⇒ Sprinkling restriction in effect year round;
- ⇒ Notices of sprinkling restrictions on the City's website, quarterly leaflet, utility billings and on the local access cable channel;
- ⇒ Leaflets available on the City website and references in the annual consumer confidence report;



- ⇒ Leak detection program;
- ⇒ Adoption of the Stormwater Management Ordinances
- ⇒ Were there any other programs the Utility is aware of?

## **LAND USE PLANNING, STORMWATER MANAGEMENT AND DEVELOPMENT REVIEW MEASURES**

The following is a summary of several ways that the Department of Community Development (DCD) furthers water conservation efforts here in New Berlin through the regulation of land use, stormwater management and construction activities. Many of these items described below are not directly related to water conservation “per se” but, they do reflect our efforts surrounding water preservation and improving water quality.

The Department of Community Development (DCD) literally aids in the coordination and regulation of all construction activity within the city. The DCD also establishes and coordinates compliance with all storm water regulations. The DCD practices what we call “*three-dimensional water resource planning*”. Focusing efforts on protection of groundwater, surface water and storm water resources.

Many of the aforementioned water studies have been utilized over the years in refining the City’s Comprehensive Plan and utility needs. This was especially true during the preparation of the Growth and Development Master Plan update to the City’s 1987 Comprehensive Plan. Since that time, DCD has been involved in the following initiatives and/or ways of promoting Low Impact Development (LID) in order to preserve our water resources.

- The Department of Community Development has, over the past several years, developed a number of ordinances and policies to assist in our efforts to promote “*Three-Dimensional Water Resource Planning*”. This is the protection of groundwater, surface water and managing storm water conveyance. Through the direction of Randall Arendt (one of the nation’s foremost experts in conservation subdivision design & development), the City has a conservation subdivision ordinance that requires that 75% of lands in any given conservation subdivision be set aside for permanent open space preservation for those without public utilities. For those conservation subdivisions with public utilities, our ordinance requires that 65% of the land be set-aside for permanent preservation. To the best of our knowledge, this is one of, if not the strictest conservation requirements within the State in terms of minimum open space requirements. Our ordinance also allows a transfer of density option in order to preserve additional open lands while allowing compensation to the parcels giving away their development rights. In the past, our Department has proposed a purchase of development rights program. However, that program was not funded.
- In combination, we also promote the use of alternative “best management practices” (BMPs) for handling storm water. The encouragement of “green-roofs”, bio-retention swales, rain gardens, rain barrels and “prairie restorations”,

all promote habitat restoration and groundwater recharge. Our Department has effectively promoted these ideals over the past two or more years. For example, the Settler's Ridge Subdivision located off of Wehr Road is 15 lots on 75 acres. Our Department required the developer to restore and enhance the open space into a "prairie habitat" that will be forever preserved offering not only visual benefits but functional as well, for overland flow of storm water allowing for groundwater recharge.

- The Deer Creek Inn & Conference is a mixed-use development to be located on the southwest corner of Moorland Road and Greenfield Avenue and will offer a 405 room hotel, indoor water park, conference center, restaurants and retail shops. Our Department has worked with the developer to include, as part of this development, a "roof-top rain garden / green-roof" that will cover approximately 75% of the roof. The "roof-top rain garden / green-roof" will collect water and transfer it into cisterns located in the lower level. That captured water will then be used to water the landscaping on site and keep the wetlands adjacent to the development within Deer Creek hydrated. In addition, the ramps and walkways will be heated with excess heat from the water park so that no salt will be used during the winter to melt ice.
- Another example of how "best management practices" have been incorporated into a new development is the recent Living Word Church project. They are installing bio-infiltration swales that will contain engineered soils. These swales will be planted to follow DNR Technical Standards. They will also have temporary diversion swales during construction, which will protect the bio-infiltration swales.
- The recently approved Crossroads Community Church is an additional example of the incorporation of BMPs. This project will include bio-infiltration swales with engineered soils. A portion of the parking that will be used for larger church services will be grass covered with geo-blocks. This will help treat runoff as it comes off the parking lot before it enters the storm water ponds.
- A recent project in the New Berlin Industrial Park was a Dog Day Care. This was a new use to the City. In working with the applicant, Staff had some concerns about the amount of animal waste and runoff from chemicals that this site would generate. Working collectively, DCD staff, DNR staff and the applicant worked on incorporating a rain garden and the proper use of environmentally friendly chemicals that do not degrade water quality and do not negatively impact the drainage ways and watershed.
- Through continuing education, our Department is beginning to learn more about applying the standards found under the Leadership in Energy Efficient Design (LEED) program. With the recently approved Willowtree Development, an approximately 350,000 square foot building, the developer coordinated with our Department and was able to incorporate storm water BMPs into the site design and also various LEED design criteria. Besides incorporating energy



efficient elements into the building's construction, the property will also be water efficient in terms of watering its landscaping. Water usage will be reduced by 50% or more for the site's landscaping. Irrigation water will be used from the retention pond. In addition, a portion of the parking used for overflow parking will be grass covered with geo-blocks, further allowing infiltration and treating runoff prior to reaching the retention pond.

- Another project that is promoting groundwater recharge, enhances aquatic habitat and helps to protect our water resource assets is the Underwood Creek "Prospect Parkway" project being managed by the City's Water Resource Utility. Depending upon funding availability, this project is incorporating rain gardens, bio-retention swales, infiltration basins & trenches, native / prairie plantings and providing for additional wetland plantings that will help absorb additional water & pollutants and detaining additional water from entering the creek causing flooding problems downstream.
- The current study underway for the redevelopment of the New Valley Sand & Gravel Quarry (Mill Valley Business Center) is being site designed to support 100% groundwater recharge for all storm water. In addition, LEED standards will also be recommended for new development.
- The City's upcoming Comprehensive Plan update will focus on neighborhood planning efforts and identification of significant environmental features in the city and ways to preserve their integrity and further our three-dimensional water resource planning ideals.
- In 2001, the Department conducted and prepared an Urban Ecological Analysis report. The project used the CITYgreen software that American Forests utilizes to examine the environmental and economic benefits of trees and green spaces within the City. This information is currently used on various maps within the City including the Map of Potential Conservation Lands and the Departments front counter maps to help staff and others quickly see area of the City and their associated tree canopy.
- The Department promotes water quality management measures to meet the City's WPDES Permit requirements by administering and enforcing the provisions of the City's Storm Water Ordinance No. 2193, the Illicit Discharge Ordinance No. 2269, the Erosion Control Ordinance No. 2268 and the Post Construction Ordinance No. 2267. The intent of this enforcement is to reduce the amount of sediment and other pollutants reaching the waters of the State. Our Department, through the Water Resources Management Utility have implemented a strong code compliance program to monitor all on-site construction activities related to erosion control and storm water management to ensure that all construction sites are in compliance with federal, state and local laws regulating water quality and storm water. All of which ultimately protects our water resources.

- In addition, our Department is responsible for inspecting all plumbing devices pursuant to Comm 84.20 regarding flow control and flow restricting devices.
- Members of our Department also serve on various statewide or regional boards or commissions that focus on improving land use planning and / or improving watershed & water resource management.

Due to increasing and complicated legislation & regulations relating to water resource protection, there needs to be a change in community development programming at all levels of government. Managing water resources is critical in high-quality land use planning and the overall health & integrity of these vital resources.

### **CONSERVATION MEASURES**

Programs or activities to achieve water conservation can be classified into three categories: 1) program actions, 2) voluntary and 3) mandatory. Program actions are those activities that can be directly taken up by the City. Voluntary activities are those that use education or incentives to promote water conservation. Mandatory activities are those that use regulations and ordinances. These measures can be combined or phased in over time.

Suggested/Recommended Program Actions:

- ♦ **Add bulleted list of potential programs**
- ♦ Install rain garden – maybe hold a rain garden workshop or construct a model at City Hall
- ♦ Install low flow fixtures at City Hall or other City buildings and monitor decrease in water usage
- ♦ Install rain barrel at City Hall
- ♦ When brushing your teeth, do not let the water run.
- ♦ Check the cycle of your water softener.
- ♦ Use water conserving shower heads and replace them as necessary.
- ♦ Check every faucet in your home for leaks (just a slow drip can waste 15-20 gallons per day).
- ♦ Remove obstacles for the zoning and building code to allow for rain harvesting tanks in all zoning districts. Encourage new subdivisions through homeowner association declarations of restrictions to allow them as well.
- ♦ Encourage all new subdivisions to plant street trees and water harvesting for landscape irrigation.

Suggested/Recommended Voluntary Actions:

- ♦ **Add bulleted list of potential programs**
- ♦ Install low-flow fixtures
- ♦ Install rain barrels
- ♦ Use native plantings in landscaping
- ♦ Install a rain garden

- ♦ Rebates for installation of water efficient appliances – see appendix with types of fixtures (this will need more research).

Suggested/Recommended Mandatory Actions:

- ♦ **Add bulleted list of potential programs**
- ♦ Sprinkler Ordinance – impose fines when not followed
- ♦ Require low flow fixtures in all new development, including residential homes.

**Water Conservation Tips (Based on the City of Madison)**

1. Good Watering Practices

- ♦ Water lawn and garden, not pavement: Position sprinklers so that water lands on plantings and isn't lost to evaporation or the storm drain.
- ♦ Check weather reporting or buy a rain gauge to monitor whether watering in addition to rain is needed; most established lawn and garden plantings do well on an inch of water per week.
- ♦ During drought, turf grass plants need only 1/4 inch of water a month to survive. If lawn and garden do need water, limit loss to evaporation.
- ♦ Water before 8:00 a.m. when it isn't windy, position a sprinkler to avoid losing water on driveway or sidewalks, and water slowly so the soil can absorb the water.
- ♦ Water the lawn only when needed. Step on the grass; if it springs back up when you move your foot, it does not need water.
- ♦ Water less frequently and thoroughly. A good soaking is better than watering frequently and will allow the roots to grow to greater depths and help make turf more drought tolerant. Lawns need about 1 inch per week. Hint: Place 3-5 empty tuna or cat food cans at varied distances from the sprinkler. The time it takes to fill the cans is about how long you should water your lawn.
- ♦ Consider alternate-side use in hot, dry conditions when many people may be watering. In addition to the recommendations above, if your house has an even-number address, limit outdoor use to even-numbered calendar days; if it has an odd-number address choose odd-numbered calendar days.

2. Collect rain water in a rain barrel or cistern

- ♦ Water that runs off hard surfaces such as roofs can be collected and put to use in the garden. Rain water is "soft," without groundwater minerals or chlorine, so it's more plant-friendly than tap water. Capturing water from gutters and downspouts in a well-designed rain barrel conserves the municipal supply while providing the best water for lawn and garden. To learn more, go to: Sustain Dane's rain barrel program, <http://www.rainfordane.org>.

3. Only Rain In The Storm Drain!

- ♦ Everything from our streets drains to surface waters and someone's ground water, so we need to try to keep plant material, toxins (fertilizer, pesticide,



herbicide) and debris out of the storm sewers--and we need to avoid wasting ground water by sending it down the storm drain.

4. Rain gardens

- ♦ Manage rainfall on your property as much as possible, using the contour of the area and plantings to slow the flow of water, use it and offer it back to the atmosphere. To learn more, go to the DNR's website.
- [UW Extension Home & Garden](#)
- [Wisconsin DNR Water Protection Milestones](#)

Add incentive program / rebate language here....if being proposed???? [I THINK THIS IS SOMETHING THE UTILITY COMMITTEE OR ALDERMAN WILL HAVE TO DISCUSS AND SUGGEST AS THEY WILL BE THE ONES APPROVING/SUGGESTING THE ORDINANCES]

Mandatory programs or activities usually have fines or penalties for noncompliance.

Conservation can be encouraged in different ways. The simplest application to minimize impact on City residents is to require conservation measures for new development, so that it is incorporated from the outset, and to provide incentives for existing homes to conserve.

### **PROGRAM ACTIONS**

The City should designate the Water Utility and the Department of Community as the responsible departments for implementing this Water Conservation Plan. Each department would work cooperatively in administering, educating and implementing the programs and policies identified herein. To further the Plans implementation, the City should set city-wide and household conservation goals and publicize them.

New Berlin should act as a role model for water conservation. Some of the areas where the City can lead by example are as follows:

- ⇒ Continue to promote three-dimensional water resource planning;
- ⇒ Implement best management practices (BMPs) for conservation and utilize public lands as pilot projects;
- ⇒ Actively coordinate all land use planning elements thru sound community development;
- ⇒ Provide water resource utility fee credits to property owners who utilize BMPs on their property (ie. pervious paving, rain gardens, bio-swales, etc.).



## REDUCING WATER USE

### **INCENTIVE PROGRAM FOR RESIDENTS**

[I THINK THIS IS ALSO SOMETHING TO DISCUSS WITH THE UTILITY DEPARTMENT TO SEE WHAT INCENTIVES ARE APPROPRIATE.]

New Berlin has set a preliminary goal of a **??%** reduction in per capita water use reduction in the city by 2020. This goal is based on prior experience with other municipal water conservation programs. New Berlin is also seeking to reduce peak water demand by **1 (??)** MGD through controls in water sprinkling. The city will develop a program that provides monetary and other incentives to water users to reduce water use. Many water utilities use incentive-based programs to encourage water use reductions. This is usually done in tandem with a change in the rate structure that discourages increases in water usage. **???????????**

#### **Add bulleted list of potential programs**

- ♦ Family that reduces their water usage most based on the previous quarterly bill receives a gift card to a local restaurant.
- ♦ Family that reduces their water usage most based on the previous yearly bill receives an overnight stay at the Country Inn and Springs Water Park or other hotel.

## DETECTING and REDUCING LEAKAGE IN THE NEW BERLIN WATER SYSTEM

Leakage from the water system provides a significant (??) opportunity to reduce the amount of water that is pumped from water supplies by the New Berlin Water Utility. The New Berlin Water Utility should institute a more detailed water audit for the system to identify priority areas for water main replacement. While leaks do go back into the groundwater system, the water does not go back into the deep aquifer that provides most of the utility's water supply. Reducing leaks increases water pressure within the system and reduces energy costs for water pumping.

### **IMPLEMENT CONSERVATION PLAN and CONDUCT PUBLIC OUTREACH & EDUCATION**

The New Berlin Water Utility and Department of Community Development will implement the final conservation plan encompassing the information gathered. The City will circulate the plan to local stakeholders, government officials, and utility staff to generate support for and comment on the plan. The Department's will implement the plan's measures and track progress.

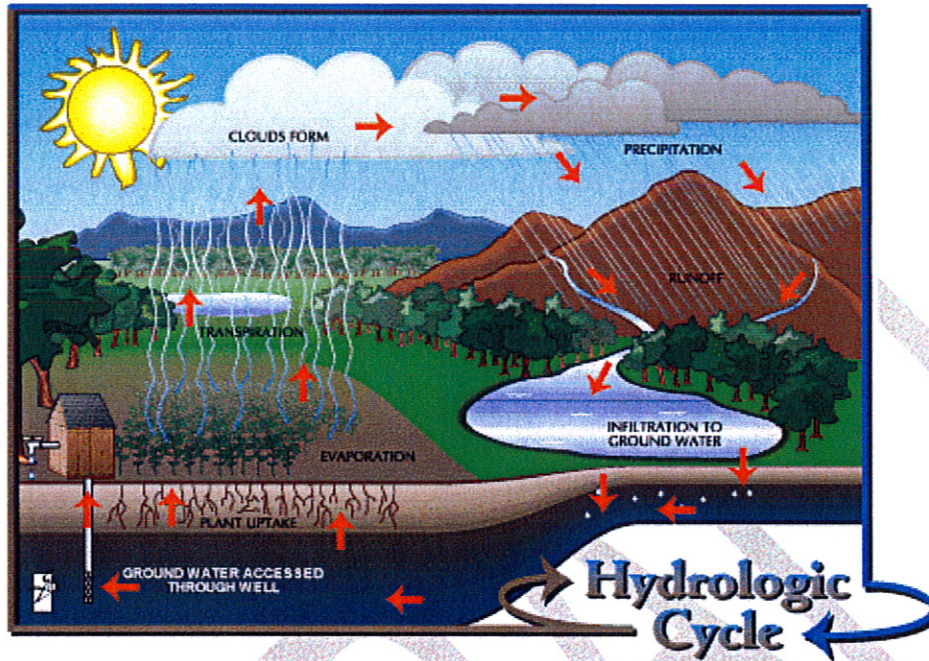
The City will actively promote implementation of the conservation plan through public education and outreach in the New Berlin schools and the press. The City will utilize existing educational and outreach materials available through: the California Urban Water Conservation Council – [www.h2ouse.org](http://www.h2ouse.org); [www.everydrop.org](http://www.everydrop.org); [www.waterwiser.org](http://www.waterwiser.org) and the American Water Works Association at [www.awwa.org](http://www.awwa.org).

The Utility will also conduct an ongoing monitoring program to assess the effectiveness of water use reduction activities through actual water use savings, customer participation, and costs of device maintenance. The Utility will regularly report on the program effectiveness to the Utility Committee and through annual reports to the public.

DRAFT

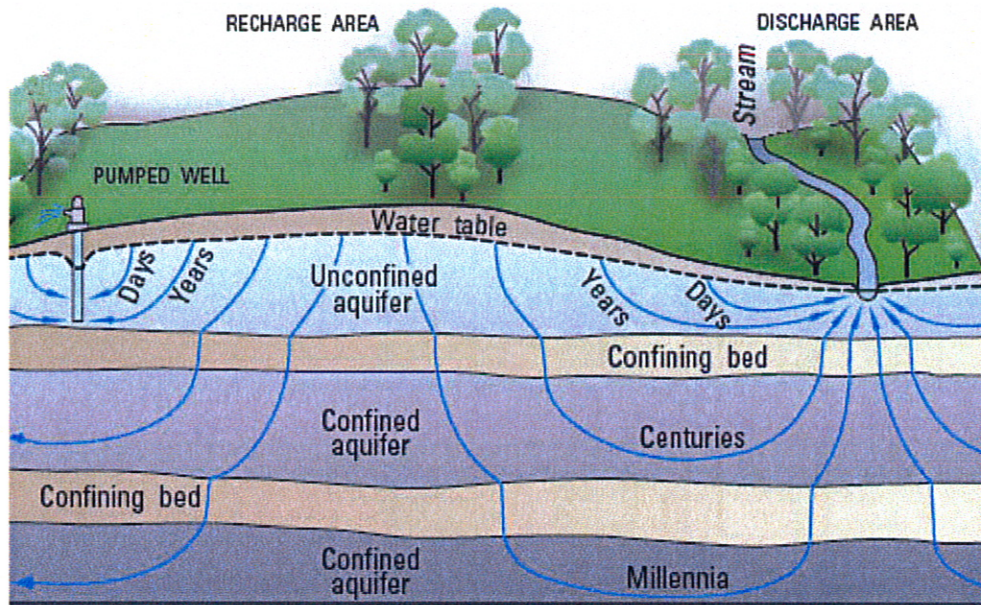


## APPENDIX A – GROUNDWATER CYCLE



*Source:* Illustrations depicting the world water supply and hydrologic cycle were developed by Stephen ADDucci, [studio d'aDDuci](#), for original use in the Purdue Pesticide Programs Pesticide and Water Quality publication PPP-35 (1995). Reuse in this program is by express agreement with the illustrator. Developed in the [Agricultural & Biological Engineering Department](#), Purdue University, 1997. Funded jointly by Purdue and U.S. EPA Region 5.

Illustrations depicting the world water supply and hydrologic cycle were developed by Stephen ADDucci, [studio d'aDDuci](#), for original use in the Purdue Pesticide Programs Pesticide and Water Quality publication PPP-35 (1995). Reuse in this program is by express agreement with the illustrator.





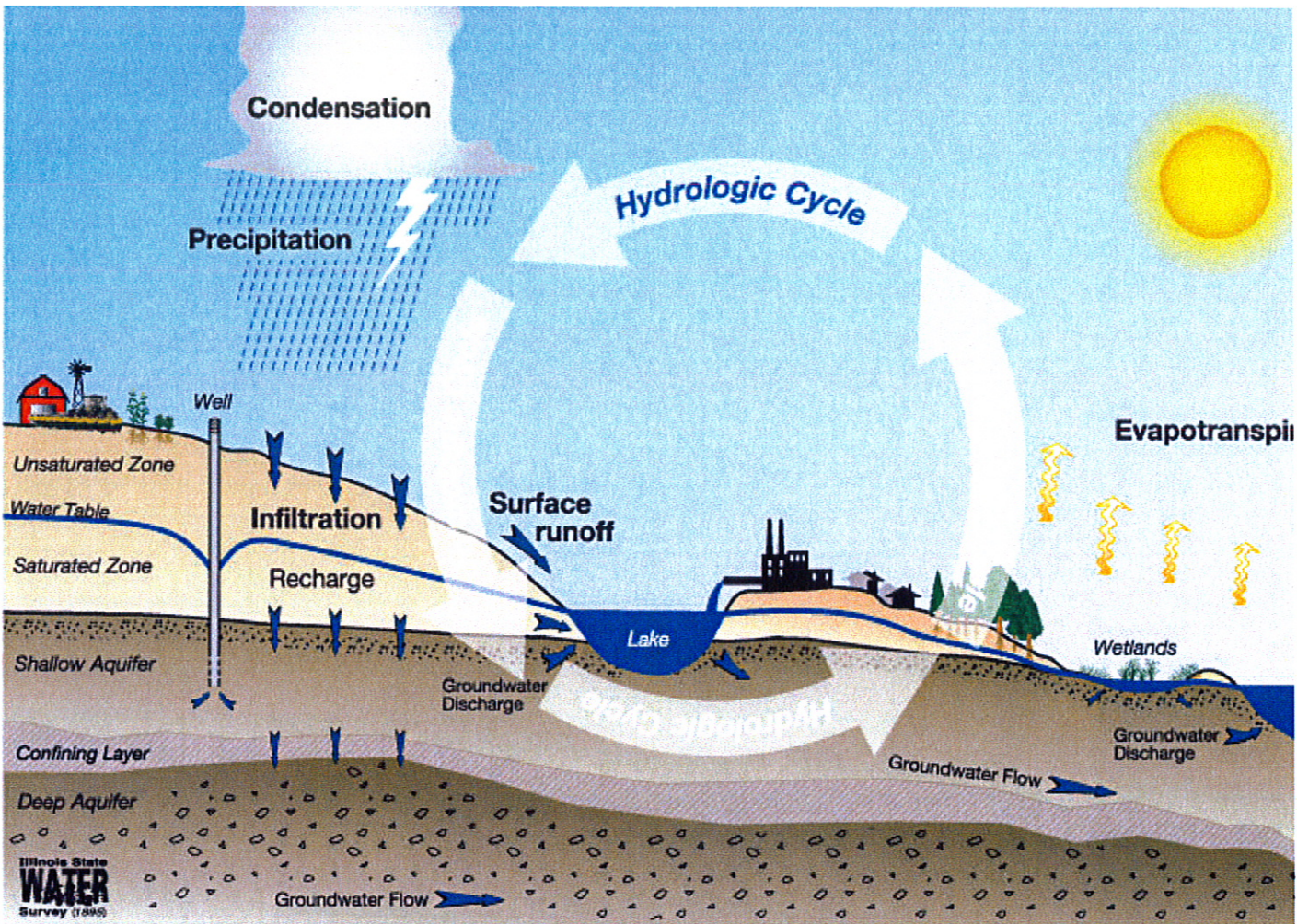


Fig. 1 The Water (Hydrologic) Cycle [back](#)

The water cycle depicts water moving through the atmosphere and on and under the surface of the earth. Another term for the water cycle is hydrologic cycle. Water moves

- downward as **precipitation**, into the soil and through the unsaturated zone as **infiltration**, and through the saturated zone to shallow and deep aquifers as **recharge**;
- laterally on the surface as **surface runoff** to lakes, wetlands, streams, and rivers and underground as **groundwater flow**;
- upward as **evapotranspiration** from lakes, wetlands, streams, and rivers, plants, soil, and groundwater, and as **groundwater discharge** to surface waters; and
- laterally aloft as atmospheric moisture, where **condensation** forms clouds.

Arrows depict movements in the water (hydrologic) cycle.

Except where indicated, all photos/graphics have been taken/produced by Water Survey staff. This page prints best in landscape mode.



Illinois State Water Survey, Contact Information  
University of Illinois at Urbana-Champaign

All files and information © 2008 Illinois State Water Survey. [Terms of use](#).  
Email the [Web Administrator](#) with questions or comments.

Last Modified: July 29, 2008



DRAFT

## **APPENDIX B – RECENT NEW BERLIN WATER STUDIES**

|  |          |
|--|----------|
| ⇒ City of New Berlin Application for Water Diversion   | 2006     |
| ⇒ Radium Compliance Study  | 2002     |
| ⇒ Lake Michigan Water Study  | 2001     |
| ⇒ Report on the Geophysical Logging Study on Well 8  | 2001     |
| ⇒ Sand and Gravel Test Boring Results  | 2001     |
| ⇒ New Berlin Energy Park Studies & Groundwater Monitoring  | 2000     |
| ⇒ Report on the Geologic Reconnaissance Study for the Siting of Shallow Sand and Gravel Wells  | 2000     |
| ⇒ Water System Study Update for Impact Fees  | 1998     |
| ⇒ Westbrook Water Service Study  | 1998     |
| ⇒ Update Supply and Storage Analysis   | 1994     |
| ⇒ Geothermal Survey for Dolomite Well Site – Valley View Park  | 1992     |
| ⇒ Geothermal Survey for Locating a Dolomite Well Site – Westridge Subdivision  | 1992     |
| ⇒ Shallow Geothermal Survey for Valley View Park Test Well Site  | 1992     |
| ⇒ Report on the Phase II, Sand and Gravel Well Exploration Studies at the High Pointe and Woodfield Sites in the East Half of the City of New Berlin | 1991     |
| ⇒ Report on the Phase II, Dolomite Well Exploration Study at the Westridge and Valley View Park Sites in the East Half of the City of New Berlin     | 1991     |
| ⇒ Report on the Phase I Study of the Groundwater Exploration Program for the East Half of the City of New Berlin                                     | 1991     |
| ⇒ Water System Facilities Study  | 1989-'91 |
| ⇒ Westbrook Water Service Study  | 1998     |
| ⇒ Update Supply and Storage Analysis   | 1994     |
| ⇒ Water System Facilities Study  | 1989-'91 |
| ⇒ Radium Compliance Study  | 1986     |
| ⇒ Section 25 Water Study   | 1985     |

**APPENDIX C – RESOURCES**

Other Sources Cited: Lake Michigan Water Supply Study and New Berlin Application for Water Diversion as prepared by Ruekert/Mielke

DRAFT



**MINUTES**  
**City of New Berlin**  
**Utility Committee Meeting**  
**Tuesday September 23, 2008**

Members Present: Alderman Harenda , Alderman Wysocki, Commissioner Bob Dude and Commissioner Jim Morrissey

Excused: Alderman Ament

Others Present: Rick Johnson (Utility Manager), Jim Hart (Utility Supervisor) Mayor Jack Chiovatero, City Attorney Mark Blum, Ralph Chipman (Accounting Manager), JP Walker (City Engineer), and Sue Hanley (Administrative Supervisor Utilities & Streets)

Alderman Harenda called the meeting to order at 5:03 p.m. with roll call and declared a quorum with all members present except for Alderman Ament who is excused.

**UT G-08          Approval of Minutes from the August 14th meeting**

Motion by Alderman Wysocki to approve the minutes from the August 14th meeting with the revisions Commissioner Dude had requested. Seconded by Commissioner Dude and upon voting the motion passed unanimously.

**UT 12-08          Wastewater Utility Budget**

Dude: On the preliminary budget analysis it shows what we have control of and what we don't. Footnote a) Operating revenues 2006-2008 (actual) and 2009 proposed are pretty flat, a difference of 1.8% from 2006 to 2009. We haven't had a rate increase for about 10 years and have controlled this fairly well. We have no control over:

b) Disposal MMSD increases \$352,661 or 28.9% from 2006 to 2009 proposed.

c) MMSD capital \$337,851 or 8.0% increase from 2006 to 2009 proposed.

We don't know yet what these numbers are going to be, so if we are going to try to hold to no rate increase in 2009, those numbers will have to stay within reason, but we don't have control of these. These 2 items together are 69% of the total expenses.

d) Collection system contracted (I & I). If you look at the 2 charts, you will notice we have averaged \$893,000 over the last 9 years. He said that the some of the amount of the item for tonight's item UT 08-08 could be used in 2008.

He said that only 18.2% of our budget is under our control, and our increase over those items is less than 1.2% a year. We have done a very good job on those items. We can't control the MMSD charges and the extent that I & I drives the budget. Right now if we went ahead with the \$1,200,000 for I & I, we would be showing a \$204,000 loss and I have some heartburn with that. If MMSD Capital and MMSD disposal gets bumped up a half million dollars, we don't have a lot of choice if you agree with the premise that we don't want a budget that is negative to start with. The \$1,235,000 for I & I, there is no reason why we have to spend that much next year. Should we be doing some yes, but there is nothing driving this and there is no master plan, how fast shall we go?

Johnson: The main plan for the wastewater utility is to catch up on all of the I & I issues that we've had over the past years. Originally it was set up for us to budget \$1.5 million per year for the next 10 years. As you see in the project graph, we have started to drop that down from \$1.2 million to \$710,000 in 2013. We are trying to create more capacity in the basins.

Dude: What is driving how much each year?

Johnson: We are doing areas in different parts of the city from residential to industrial. It costs more to do industrial for the larger pipes and for bypassing when the contractor does the work.

Dude: How much have you done over the years?

Wysocki: Is this the only project for 2008? The budgeted amount for 2008 was \$1.2 million.

Dude: We've spent \$984,000 to this point.

Wysocki: Does that include this project?

Dude: We have \$211,000 left in this year's budget so some of this project can be applied to 2008 and the rest will be charged to 2009.

Harenda: I thought we couldn't encumber funds because the budgets aren't set yet?

Chipman: The Utility enterprise funds are a different basis than the City. In this case we will be able to do it. We will only recognize the work down in 2008. If there was only \$200,000 worth of work done, that will be paid in 2008.

Motion by Commissioner Dude to recommend to Common Council to approve the award of Construction contract for Sanitary Sewer re-lining, replacement, manhole grouting, testing and sealing for the Glendale and Overland Drive Project to the lowest responsive and responsible bidder, Visu-Sewer Clean & Seal Inc., in the amount of \$561,700.00 for a total project cost not to exceed \$ 711,000.00. Source of Funds: Wastewater Account 81001131.52030. Seconded by Commissioner Morrissey and upon voting the motion passed unanimously.

**UT 12-04      Status on Milwaukee Water Expansion and**  
**UT 09-08      Milwaukee Water and Rate Case Requirements**

Harenda: In a memo from Ralph Chipman, he is looking for direction from the Utility Committee to accurately prepare the budget and rate case application: Projected infrastructure costs and funding source, Construction timeline, Actual hook up date, Expectation of the timing of the rate change, and Method of \$1.5 million IGA payment.

Chipman: The PSC has informed us that due to staff shortages the time to complete a rate case is currently 160 days instead of the normal 90 days. I don't know in the future if they hire more people that would change and the fact that this is not your normal rate case, it may take more time since it is more complicated.

Harenda: Commissioner Dude is working with staff on the Water Utility Budget, do you have any comments?

Dude: When we looked at the budget I asked myself what are the basic assumptions? When are we going to turn it on and what are the hoops you have to do that? The first hoop is when the DNR/EPA will do the contract approval. Infrastructure (pipes, pumps) must be completed and where does that leave us in terms of rates. I have heartburn about pumping water until we have rates approved and feedback from the PSC. The IGA will go from the City of New Berlin to the City of Milwaukee and of course the Water Utility will have to reimburse the City and we have talked about the Water Utility borrowing from the Sewer Utility since it shares the interest and eliminates some outside rating costs. Until we get these questions answered, it is difficult to prepare a budget. I can't see this all happening before July 1<sup>st</sup>, but I think we have to lay the timeline out before we can make budget assumptions.

Harenda: We can't do anything until the DNR and PSC approves the contract and the IGA. My comment has been that we should borrow the \$1.5 million from the Sewer Utility. Rick had put together a spreadsheet a few meetings ago of what needs to be done regarding upgrades pumphouses, installation of SCADA systems, estimations and timetables of what still needs to be bid. We should be bidding all of this out instead of always dealing with the same individual. If they come in as the low bidder great, but what is the cost going to be which will have an impact on our budget and the timeline will dictate the cost. Another question that Ralph had was what is the status regarding water conservation rates. My personal opinion is that the rate case we are working on right now should concentrate on getting water to the western half of the utility. The conservation rate is something new that the City of Waukesha has



proposed, we are working on this with Greg Kessler and our DCD department in conjunction with our comp plan review to incorporate what we are already doing and what we want to do to conserve water. Conservation rates and a new sprinkler ordinance are probably the next step and putting together some type of funding source and incentive program to getting people to go to low volume toilets and faucets. That is a separate issue all together, but I don't want to cloud that issue with that. I think our staff, Ralph has been doing the rate case in the past versus outside consultants but I will leave that up for discussion.

Wysocki: In fairness to you Ralph, I don't want you working here on Saturdays; did you work out with Mike to fit this into your normal work schedule?

Chipman: We've done in house the last 2, there are plenty of firms that can do it Virchow Krause our auditors are experts on it also. Right now the hold up is if we don't have some of the information, nobody can work on it. The fundamental things need to be addressed before we can start.

Wysocki: So you can handle it?

Chipman: We can get it done.

Wysocki: So I will see you here on Saturdays.

Chipman: I guess it depends on the timing. We will have the auditors here and if we need to go out we can.

Wysocki: Keep us alert of that. There are 2 points that are crucial. To start this we need to have our finances straight and central to that is the rates, but the 2<sup>nd</sup> thing is the physical part. There is work that has to be done before water can be turned on. We won't start that until the contracts have been approved. How long will it take to have the conveyance system in place?

Johnson: We have to look at what engineering firm will be doing this, then we will have to bid it out, awarded and then the work will take about 3 months because you have to order the parts, motors, etc. As far as doing the turnovers for filling the extra waters and reservoirs and getting the SCADA system to work, it will all be done close together.

Wysocki: Is there a project timeline when we have this in place?

Johnson: It is difficult to give a timeline when we don't have approvals.

Wysocki: Make the assumption the approvals are given, could you give us a project timeline look to how this gets set up.

Johnson: By the time you do the bidding and design work, it will take 5-6 months.

Harenda: Can you take the spreadsheet and put together a timetable, the milestones we have to hit, something similar to what we did when we put the first infrastructure in for the eastern half of the Utility. The steps of what we do for bidding, who is going to design what, what we bid out for professional services and construction services. You should have an estimate that we could take to prepare the budget and would dictate what the rate increase would be to cover that next year and in the future.

Johnson: If we decide to change engineering firms we will have to add on 2-3 months to get the firm up to speed to how our system really works because R & M has designed most of the City's system to begin with.

Harenda: They aren't redesigning it, it isn't rocket science, it is a conveyance system, we are just modifying the existing system.

Johnson: You have to take into consideration the pressure zones, the capacities, how our SCADA system works to integrate the upgrades we need to get the water into our facility.



Dude: We may want to do a critical path chart which lays out all of the things that has to be done and one follows the other. You can also do a critical path chart with dollars and you say where can I spend some dollars to make the path shorter. I did that on an MBA project.

Harenda: We did that in the last project. Is that something you can get together by our next meeting Rick?

Johnson: I can give you a rough estimate and prices.

Wysocki: If you believe we can jump start this but we need expenditures, I appreciate the dollar amounts you would need authorization for relative to certain costs. I am very confident that what is been done is the right thing and will work. It is just a matter of bureaucracies responding to the effort we put in.

Johnson: As far as design work?

Wysocki: Yes, let us know.

Chiovatero: We are not off that hook yet, it is better if we move forward and show we are working on it instead of just sitting on our hands. What Alderman Wysocki said is very crucial to that. If there is anything we can do now with no expenditure or very small expenditures since we know we are going this direction, it would not be funds spent for nothing. We need to move forward.

Harenda: I agree. In the overall Water budget, what are we going to do with the existing infrastructure, including our well systems, how long we will keep them online? That will have an impact going forth, maybe not in 2009, but I have talked to Rick and Bob Dude about these things so I will look for your expertise on that. When Lake Michigan water flows to rest of the Utility, the old system is still looked as a backup source or reserve, but we should be able to wean ourselves off that and eliminate it all together.

Chiovatero: As far as our backup system and old wells, talking with the engineering firm that is working on this, their suggestion is before we abandon them, we get through a full peak season to make sure our SCADA is under control and we will be out of any possibility of paying overage charges.

Harenda: I agree. That goes back to talking about the contract and we were told that we have significant capacity with Milwaukee water works now and we should be OK, but I agree we should have some history before we go in that direction. Ralph put together some cost savings if we transition over in mid year 2009 and you will see more in 2010 and 2011. Does that answer the questions you are looking for?

Chipman: Yes sir.

Harenda: If something does break, Rick, Ralph or the Mayor will inform us.

#### **UT 05-07      Water Conservation Measures –Potential Rate Adjustments**

Morrissey: I would like to echo some of Alderman Harenda's comments earlier that we need to go slow and study this issue carefully and make sure we have public input and this should be on the back burner until we get the rest of the service area City water.

Harenda: With our comprehensive update, Staff is looking at Stormwater and what we are doing internally. The DNR may rewrite some rules.

Dude: We may have to move faster than we would like to if the PSC in conjunction with the rate approval would turn the screws on us in terms of conservation measures. Right now we have an odd/even sprinkling schedule and tell people about it once a quarter but they may conveniently forget. That could in fact come up when the rates go to the PSC. I don't disagree that we should have a public hearing but we should think about a back up plan.

Harenda: The Public Service Commission can't force conservation rates on the Utility to start changing water and the DNR doesn't have the right to force us to go with the conservation rates. They can put in

percentages to save water and cut back on usage by sprinkling bans and playing with the rate structure to try to get people to use less water, I may be wrong.

Chipman: I e-mailed Dave Prochaska and Jeff Ripp at the PSC so that we knew what to do when preparing our rate structure. I asked them if conservation measures would be part of the rate case and the response from Jeff Ripp was that. "In general the PSC does not require Water utilities to implement water conservation programs. Rather the PSC has approved utilities that are using voluntary programs; however given the pending situation of New Berlin purchasing additional water from Milwaukee, DNR may wish to include some water conservation requirements under the Great Lakes Compact. One difficulty is that these rules are not yet in place, but if these rules would result in additional cost to the Utility, it might be worthwhile to make sure that these are in the rate case." I received that on August 25<sup>th</sup>.

Harenda: That is if the DNR has their administrative rules in place, but that may not happen soon. I talked to Ralph last year about separating the 2 issues into separate rate cases. I think it clarifies it to the Utility customer that we are charging this amount to provide a product. Now we charge you this amount to reduce the consumption or amount of product being utilized.

Morrissey: I think the issue is how much of an increase it is. I think Bob makes a good point, we may be forced.

Wysocki: I think the City of Waukesha already passed an ordinance. Are we going to copy that?

Harenda: Yes. We are working forward. The Mayor brought forth some information from a conference and I will be meeting with Greg Kessler on the issue.

#### **UT 07-08      New Berlin Urban Service Area Boundary (discussion)**

Harenda: A map was put together and presented to the Plan Commission at the last meeting. The Common Council will be setting a public hearing to solidify the boundaries. I will make sure that Commissioner Morrissey and Commissioner Dude will get a copy of the map. Bob had a great idea. There will be public comment on that.

#### **UT 10-08      Wireless Lease Consultants ("WLC") offer to purchase wireless communications easement**

Commissioner Dude showed the committee a spreadsheet that showed the total gross amount to be received under the current contract was \$1,363,596. The net present value of payments @ 2.2% (current LGPI rate) is \$916,138 versus the various generous offer of \$85,512. I will even give them 3% using the rule of 72 which means take 72 divided by 3%, 24 years you double your money, the last 6 I will take ¼ so that is a grand total of \$213,780, so they are only offering to underpay us by \$700,000. I would tell these people to go away and I don't want to see any more of these.

Harenda: What are you looking for an action on this?

Johnson: It was just information they emailed us about trying to get a better deal on the lease.

Chipman: These guys have been calling us fairly regularly and I told them I had a fairly good idea where this was going to go, but they wanted it on the agenda and felt we had to put it before you.

Johnson: It is just a company that tries to broker.

Chipman: If you tell us to call them back and say you have no interest in this, that would be appropriate.

Morrissey: I think no is the appropriate word. Maybe we should say later on if they want us to put something on the agenda, they have to attend the meeting.

#### **UT 11-08      Water Utility Budget**

No further discussion



Table IV-9

**PLANNED INITIAL ASSUMPTIONS CONCERNING EFFECTIVENESS OF WATER CONSERVATION  
PROGRAM LEVELS FOR USE IN ALTERNATIVE PLAN DEVELOPMENT FOR THE REGIONAL  
WATER SUPPLY SYSTEM PLANNING PROGRAM FOR SOUTHEASTERN WISCONSIN**

| Water Utility Category  | Future Water Conservation Assumption<br>Over and Above the Current Level <sup>a</sup> |  | Comments   |
|---|---|--|--|
|   | Average Day<br>Demand Reduction<br>(percent)  | Maximum Day<br>Demand Reduction<br>(percent) |  |
| <ul style="list-style-type: none"> <li>• Lake Michigan Supply with Return of Spent Water</li> <li>• Adequate Water Supply Infrastructure in Place for 10 or More Years</li> </ul>                       | 4   | 6  | <ul style="list-style-type: none"> <li>• Assuming a current level of water conservation effectiveness of 4 percent, these values would equate to total reduction level of 8 and 12 percent</li> <li>• Total reduction levels of 8 percent</li> <li>• Cost of water conservation program may be offset by savings in operational cost</li> <li>• Cost savings associated with infrastructure avoidance is not a major consideration</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Lake Michigan Supply with Return of Spent Water</li> <li>• Some Water Supply Infrastructure Needs Expected During the Next 10 Years</li> </ul>                 | 4   | 10   | <ul style="list-style-type: none"> <li>• Assuming a current level of 4 percent, these values would equate to total reduction levels of 10 and 14 percent</li> <li>• Cost of water conservation program may exceed savings in operating costs</li> <li>• Cost savings associated with infrastructure avoidance is an important consideration</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Groundwater Supply</li> <li>• Adequate Water Supply Infrastructure for 10 or More Years</li> <li>• No Major Aquifer Quality or Quantity Issues</li> </ul>      | 6   | 12   | <ul style="list-style-type: none"> <li>• Assuming a current level of 4 percent, these values would equate to total reduction levels of 10 to 16 percent</li> <li>• Cost of water conservation program is expected to exceed savings in operating costs</li> <li>• Cost savings associated with infrastructure avoidance is not a major consideration</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Groundwater Supply</li> <li>• Major Infrastructure Needs Expected During the Next 10 Years</li> <li>• No Major Aquifer Quantity or Quality Problems</li> </ul> | 8   | 16   | <ul style="list-style-type: none"> <li>• Assuming a current level of water conservation effectiveness of 4 percent, these values would equate to total reduction levels of 12 to 18 percent</li> <li>• Cost of the water conservation program will likely exceed the associated reduction in operational costs</li> <li>• Cost savings associated with infrastructure avoidance is an important consideration</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Groundwater Supply</li> <li>• Major Infrastructure Needs Expected During the Next 10 Years</li> <li>• Aquifer Quantity or Quality Problems</li> </ul>          | 10  | 18   | <ul style="list-style-type: none"> <li>• Assuming a current level of water conservation effectiveness of 4 percent, these values would equate to total reduction levels of 14 to 22 percent</li> <li>• Cost of the water conservation program will likely exceed the associated reduction in operational costs</li> <li>• Cost savings associated with infrastructure avoidance is an important consideration</li> <li>• Aquifer considerations may be the driving factor</li> </ul> |

<sup>a</sup>Initial assumptions which may be revised following development and evaluation of water supply alternative plans, if demonstrated as needed by cost, environmental impacts, or other factors related to the plan objectives.

Source: SEWRPC.



# Appendix B

Table B-1  
Historic and Proposed Average Day and Peak Day Water Pumpage Estimates and Estimated Sewerage Flows For In and Out of Basin Customers  
City of New Berlin, Wisconsin

| Year | Outside the Great Lakes Basin   |  | Inside the Great Lakes Basin    |  | Total<br>Average Day(1) | Total<br>30 Day Period<br>Maximum Monthly Use<br>Daily Average (2) | Average Daily<br>Sewage Flow<br>To Basin From<br>Out of Basin(3) | Average Daily<br>Sewage Flow<br>To Basin From<br>in Basin(3) | Average Daily<br>Sewage Flow<br>To Basin<br>Total(3) |
|------|---------------------------------|--|---------------------------------|--|-------------------------|--|--|--|--|
|      | Water Pumpage<br>Average Day(1) | 30 Day Period<br>Maximum Monthly Use<br>Daily Average(2) | Water Pumpage<br>Average Day(1) | 30 Day Period<br>Maximum Monthly Use<br>Daily Average(2) |                         |  |  |  |  |
| 2004 | 1.856                           | *  | 1.401                           | *  | 3.257                   | *  | *  | *  | *  |
| 2005 | 1.850                           | 2.380  | 1.395                           | 1.453  | 3.245                   | 3.833  | 2.910  | 2.760  | 5.670  |
| 2006 | 1.783                           | 2.124  | 1.318                           | 1.686  | 3.101                   | 3.810  | 2.805  | 2.749  | 5.554  |
| 2007 | 1.802                           | 1.914  | 1.334                           | 1.554  | 3.136                   | 3.468  | 2.835  | 2.782  | 5.617  |
| 2008 | 1.734                           | 1.842  | 1.313                           | 1.530  | 3.047                   | 3.371  | 2.728  | 2.738  | 5.466  |
| 2009 | 1.890                           | 2.008  | 1.578                           | 1.838  | 3.468                   | 3.846  | 2.974  | 3.291  | 6.265  |
| 2010 | 1.903                           | 2.021  | 1.588                           | 1.850  | 3.491                   | 3.871  | 2.994  | 3.312  | 6.306  |
| 2011 | 1.916                           | 2.035  | 1.598                           | 1.862  | 3.514                   | 3.896  | 3.014  | 3.333  | 6.346  |
| 2012 | 1.928                           | 2.048  | 1.608                           | 1.873  | 3.536                   | 3.921  | 3.034  | 3.353  | 6.387  |
| 2013 | 1.941                           | 2.061  | 1.618                           | 1.885  | 3.559                   | 3.946  | 3.053  | 3.374  | 6.428  |
| 2014 | 1.953                           | 2.075  | 1.628                           | 1.896  | 3.581                   | 3.971  | 3.073  | 3.395  | 6.468  |
| 2015 | 1.966                           | 2.088  | 1.638                           | 1.908  | 3.604                   | 3.996  | 3.093  | 3.416  | 6.509  |
| 2016 | 1.979                           | 2.102  | 1.648                           | 1.920  | 3.627                   | 4.021  | 3.113  | 3.437  | 6.550  |
| 2017 | 1.991                           | 2.115  | 1.658                           | 1.931  | 3.649                   | 4.046  | 3.133  | 3.458  | 6.590  |
| 2018 | 2.004                           | 2.128  | 1.668                           | 1.943  | 3.672                   | 4.071  | 3.153  | 3.479  | 6.631  |
| 2019 | 2.016                           | 2.142  | 1.678                           | 1.955  | 3.694                   | 4.096  | 3.172  | 3.499  | 6.672  |
| 2020 | 2.029                           | 2.155  | 1.688                           | 1.966  | 3.717                   | 4.121  | 3.192  | 3.520  | 6.712  |
| 2021 | 2.042                           | 2.168  | 1.698                           | 1.978  | 3.740                   | 4.147  | 3.212  | 3.541  | 6.753  |
| 2022 | 2.054                           | 2.182  | 1.708                           | 1.990  | 3.762                   | 4.172  | 3.232  | 3.562  | 6.794  |
| 2023 | 2.067                           | 2.195  | 1.718                           | 2.001  | 3.785                   | 4.197  | 3.252  | 3.583  | 6.835  |
| 2024 | 2.079                           | 2.209  | 1.728                           | 2.013  | 3.807                   | 4.222  | 3.271  | 3.604  | 6.875  |
| 2025 | 2.092                           | 2.222  | 1.738                           | 2.025  | 3.830                   | 4.247  | 3.291  | 3.625  | 6.916  |
| 2026 | 2.105                           | 2.235  | 1.748                           | 2.036  | 3.853                   | 4.272  | 3.311  | 3.645  | 6.957  |
| 2027 | 2.117                           | 2.249  | 1.758                           | 2.048  | 3.875                   | 4.297  | 3.331  | 3.666  | 6.997  |
| 2028 | 2.130                           | 2.262  | 1.768                           | 2.060  | 3.898                   | 4.322  | 3.351  | 3.687  | 7.038  |
| 2029 | 2.142                           | 2.276  | 1.778                           | 2.071  | 3.920                   | 4.347  | 3.371  | 3.708  | 7.079  |

Notes: \* Based upon Actual data corrected for accounting errors.  
(1) Data not available  
(2) Based upon SEWRPC projections in Regional Water Supply Plan draft.  
(3) Based upon 2007 Ratio of Peak Monthly Average to Average Day  
Based upon 2005 Ratio of Sewer Flows to Water Demands

# Appendix C



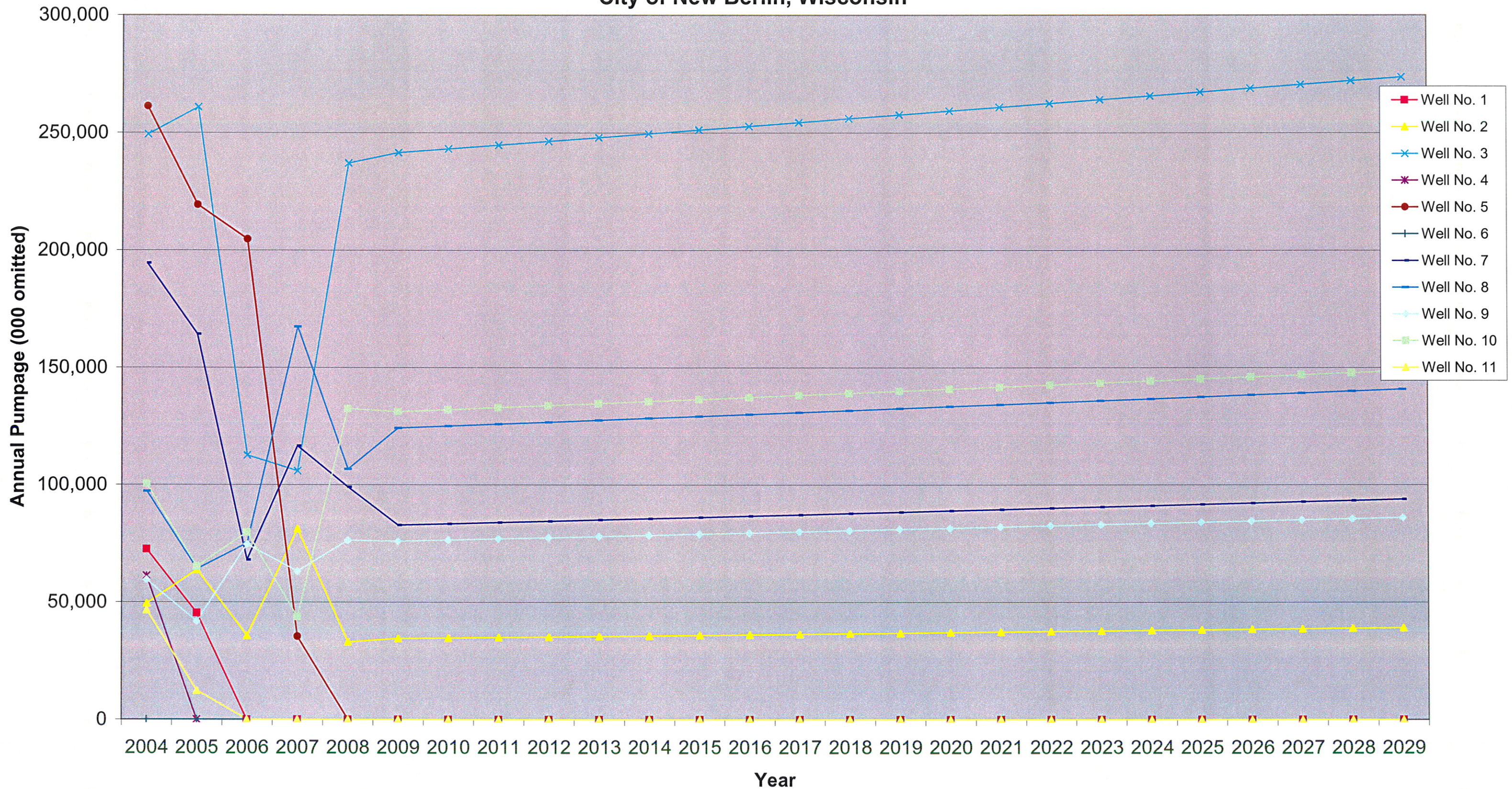
**Table C-1**  
**Historic and Projected Annual Well Pumpages Without Diverted Lake Michigan Water: 2004-2029**  
**City of New Berlin, Wisconsin**

| Year | Well No. 1 | Well No. 2 | Well No. 3 | Well No. 4 | Well No. 5 | Well No. 6 | Well No. 7 | Well No. 8 | Well No. 9 | Well No. 10 | Well No. 11 | Well Total | Lake Water Purchased | Grand total |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|------------|----------------------|-------------|
| 2004 | 72,540     | 49,429     | 249,371    | 61,161     | 261,269    | 0          | 194,506    | 97,223     | 59,507     | 100,486     | 46,612      | 1,192,110  | 0                    | 1,188,805   |
| 2005 | 45,347     | 63,741     | 260,829    | 0          | 219,375    | 0          | 164,257    | 64,071     | 41,739     | 65,117      | 12,309      | 931,027    | 240,160              | 1,184,425   |
| 2006 | 0          | 35,675     | 112,543    | 0          | 204,709    | 0          | 68,006     | 75,080     | 74,555     | 79,768      | 0           | 650,795    | 481,106              | 1,131,865   |
| 2007 | 0          | 81,177     | 105,859    | 0          | 35,357     | 0          | 116,567    | 167,358    | 63,064     | 43,718      | 0           | 657,730    | 486,798              | 1,144,640   |
| 2008 | 0          | 33,021     | 237,032    | 0          | 0          | 0          | 99,025     | 106,681    | 76,302     | 132,446     | 0           | 634,644    | 480,689              | 1,112,155   |
| 2009 | 0          | 34,500     | 241,499    | 0          | 0          | 0          | 82,800     | 124,199    | 75,900     | 131,099     | 0           | 689,996    | 575,970              | 1,265,966   |
| 2010 | 0          | 34,730     | 243,108    | 0          | 0          | 0          | 83,351     | 125,027    | 76,405     | 131,973     | 0           | 694,595    | 579,620              | 1,274,215   |
| 2011 | 0          | 34,960     | 244,718    | 0          | 0          | 0          | 83,903     | 125,855    | 76,911     | 132,847     | 0           | 699,194    | 583,270              | 1,282,464   |
| 2012 | 0          | 35,190     | 246,328    | 0          | 0          | 0          | 84,455     | 126,683    | 77,417     | 133,721     | 0           | 703,793    | 586,920              | 1,290,713   |
| 2013 | 0          | 35,420     | 247,937    | 0          | 0          | 0          | 85,007     | 127,511    | 77,923     | 134,594     | 0           | 708,392    | 590,570              | 1,298,962   |
| 2014 | 0          | 35,650     | 249,547    | 0          | 0          | 0          | 85,559     | 128,338    | 78,429     | 135,468     | 0           | 712,991    | 594,220              | 1,307,211   |
| 2015 | 0          | 35,880     | 251,157    | 0          | 0          | 0          | 86,111     | 129,166    | 78,935     | 136,342     | 0           | 717,590    | 597,870              | 1,315,460   |
| 2016 | 0          | 36,109     | 252,766    | 0          | 0          | 0          | 86,663     | 129,994    | 79,441     | 137,216     | 0           | 722,189    | 601,520              | 1,323,709   |
| 2017 | 0          | 36,339     | 254,376    | 0          | 0          | 0          | 87,215     | 130,822    | 79,947     | 138,090     | 0           | 726,788    | 605,170              | 1,331,958   |
| 2018 | 0          | 36,569     | 255,985    | 0          | 0          | 0          | 87,766     | 131,650    | 80,453     | 138,964     | 0           | 731,387    | 608,820              | 1,340,207   |
| 2019 | 0          | 36,799     | 257,595    | 0          | 0          | 0          | 88,318     | 132,477    | 80,958     | 139,837     | 0           | 735,986    | 612,470              | 1,348,456   |
| 2020 | 0          | 37,029     | 259,205    | 0          | 0          | 0          | 88,870     | 133,305    | 81,464     | 140,711     | 0           | 740,585    | 616,120              | 1,356,705   |
| 2021 | 0          | 37,259     | 260,814    | 0          | 0          | 0          | 89,422     | 134,133    | 81,970     | 141,585     | 0           | 745,184    | 619,770              | 1,364,954   |
| 2022 | 0          | 37,489     | 262,424    | 0          | 0          | 0          | 89,974     | 134,961    | 82,476     | 142,459     | 0           | 749,783    | 623,420              | 1,373,203   |
| 2023 | 0          | 37,719     | 264,034    | 0          | 0          | 0          | 90,526     | 135,789    | 82,982     | 143,333     | 0           | 754,382    | 627,070              | 1,381,452   |
| 2024 | 0          | 37,949     | 265,643    | 0          | 0          | 0          | 91,078     | 136,617    | 83,488     | 144,206     | 0           | 758,981    | 630,720              | 1,389,701   |
| 2025 | 0          | 38,179     | 267,253    | 0          | 0          | 0          | 91,630     | 137,444    | 83,994     | 145,080     | 0           | 763,580    | 634,370              | 1,397,950   |
| 2026 | 0          | 38,409     | 268,863    | 0          | 0          | 0          | 92,181     | 138,272    | 84,500     | 145,954     | 0           | 768,179    | 638,020              | 1,406,199   |
| 2027 | 0          | 38,639     | 270,472    | 0          | 0          | 0          | 92,733     | 139,100    | 85,006     | 146,828     | 0           | 772,778    | 641,670              | 1,414,448   |
| 2028 | 0          | 38,869     | 272,082    | 0          | 0          | 0          | 93,285     | 139,928    | 85,511     | 147,702     | 0           | 777,377    | 645,320              | 1,422,697   |
| 2029 | 0          | 39,099     | 273,692    | 0          | 0          | 0          | 93,837     | 140,756    | 86,017     | 148,575     | 0           | 781,976    | 648,970              | 1,430,946   |

Note: All pumpage numbers omit 000  
 Pumpages taken from SCADA records  
 Pumpages from PSC report  
 Projections based upon SEWRPC Regional Water Supply Study Draft report



**Figure C-1**  
**Historic and Projected Well Pumpages Without Diverted Lake Michigan Water: 2004-2029**  
**City of New Berlin, Wisconsin**





**Table C-2**  
**Historic and Projected Annual Well Pumpages With Diverted Lake Michigan Water: 2004-2029**  
**City of New Berlin, Wisconsin**

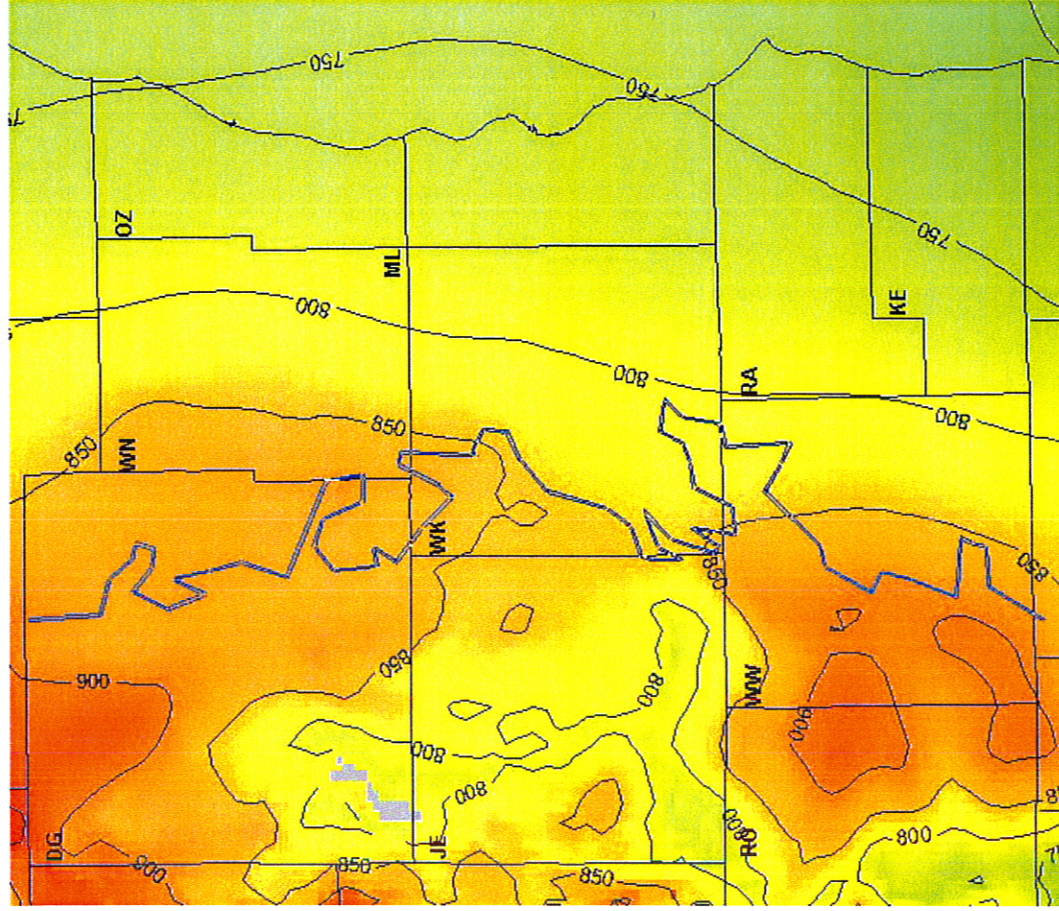
| Year | Well No. 1 | Well No. 2 | Well No. 3 | Well No. 4 | Well No. 5 | Well No. 6 | Well No. 7 | Well No. 8 | Well No. 9 | Well No. 10 | Well No. 11 | Well Total | Lake Water Purchased | Grand total |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|------------|----------------------|-------------|
| 2004 | 72,540     | 49,429     | 249,371    | 61,161     | 261,269    | 0          | 194,506    | 97,223     | 59,507     | 100,486     | 46,612      | 1,192,110  | 0                    | 1,188,805   |
| 2005 | 45,347     | 63,741     | 260,829    | 0          | 219,375    | 0          | 164,257    | 64,071     | 41,739     | 65,117      | 12,309      | 931,027    | 240,160              | 1,184,425   |
| 2006 | 0          | 35,675     | 112,543    | 0          | 204,709    | 0          | 68,006     | 75,080     | 74,555     | 79,768      | 0           | 650,795    | 481,106              | 1,131,865   |
| 2007 | 0          | 81,177     | 105,859    | 0          | 35,357     | 0          | 116,567    | 167,358    | 63,064     | 43,718      | 0           | 657,730    | 486,798              | 1,144,640   |
| 2008 | 0          | 33,021     | 237,032    | 0          | 0          | 0          | 99,025     | 106,681    | 76,302     | 132,446     | 0           | 634,644    | 480,689              | 1,112,155   |
| 2009 | 0          | 18,060     | 126,423    | 0          | 0          | 0          | 43,345     | 65,017     | 39,733     | 68,629      | 0           | 361,208    | 904,758              | 1,265,966   |
| 2010 | 0          | 37         | 116        | 0          | 0          | 0          | 130        | 165        | 83         | 72          | 0           | 603        | 1,274,215            | 1,274,215   |
| 2011 | 0          | 37         | 116        | 0          | 0          | 0          | 130        | 165        | 83         | 72          | 0           | 603        | 1,282,464            | 1,282,464   |
| 2012 | 0          | 37         | 116        | 0          | 0          | 0          | 130        | 165        | 83         | 72          | 0           | 603        | 1,290,713            | 1,290,713   |
| 2013 | 0          | 37         | 116        | 0          | 0          | 0          | 130        | 165        | 83         | 72          | 0           | 603        | 1,298,962            | 1,298,962   |
| 2014 | 0          | 37         | 116        | 0          | 0          | 0          | 130        | 165        | 83         | 72          | 0           | 603        | 1,307,211            | 1,307,211   |
| 2015 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,315,460            | 1,315,460   |
| 2016 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,323,709            | 1,323,709   |
| 2017 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,331,958            | 1,331,958   |
| 2018 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,340,207            | 1,340,207   |
| 2019 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,348,456            | 1,348,456   |
| 2020 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,356,705            | 1,356,705   |
| 2021 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,364,954            | 1,364,954   |
| 2022 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,373,203            | 1,373,203   |
| 2023 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,381,452            | 1,381,452   |
| 2024 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,389,701            | 1,389,701   |
| 2025 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,397,950            | 1,397,950   |
| 2026 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,406,199            | 1,406,199   |
| 2027 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,414,448            | 1,414,448   |
| 2028 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,422,697            | 1,422,697   |
| 2029 | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0          | 0           | 0           | 0          | 1,430,946            | 1,430,946   |

Note: All pumpage numbers omit 000  
 Pumpages taken from SCADA records  
 Pumpages from PSC report  
 Projections based upon SEWRPC Regional Water Supply Study Draft report  
 Estimate based upon 6 months of approved Diversion

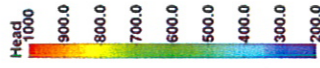








Water Levels in the Sandstone Aquifer  
(feet above sea level)

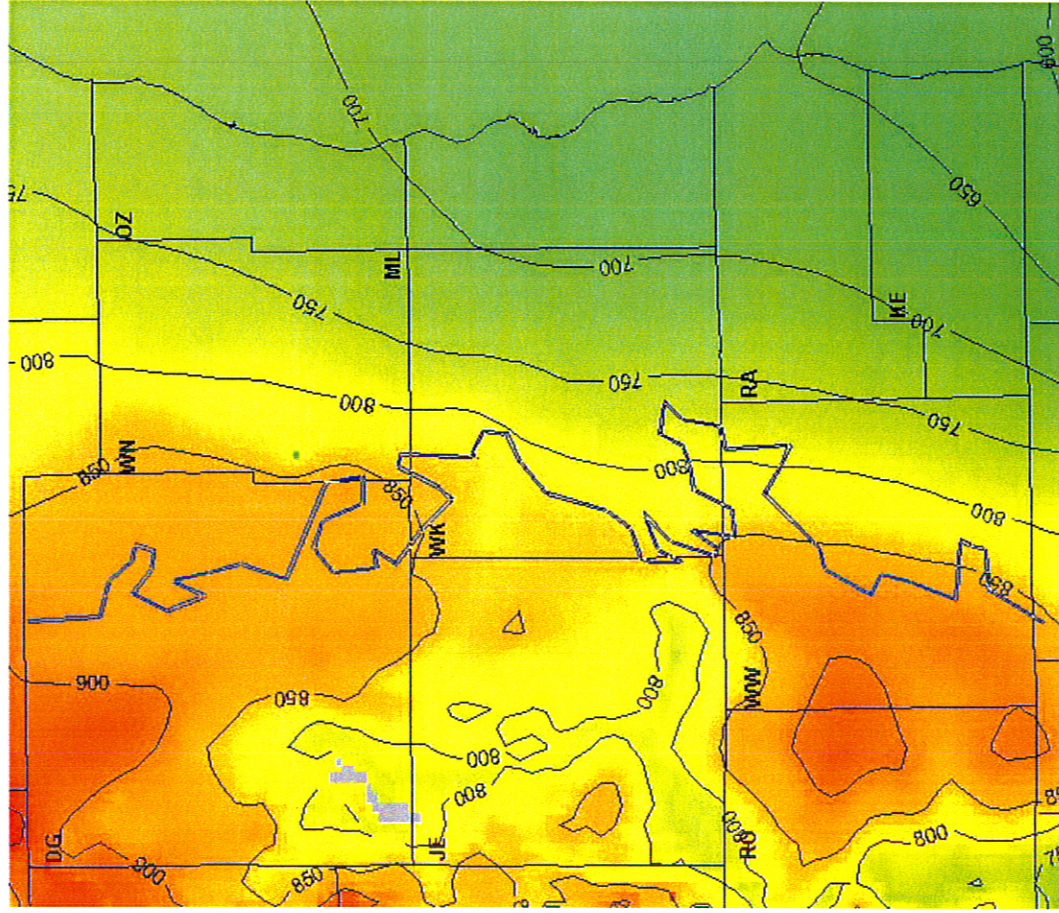


Well Locations and Pumping Rates

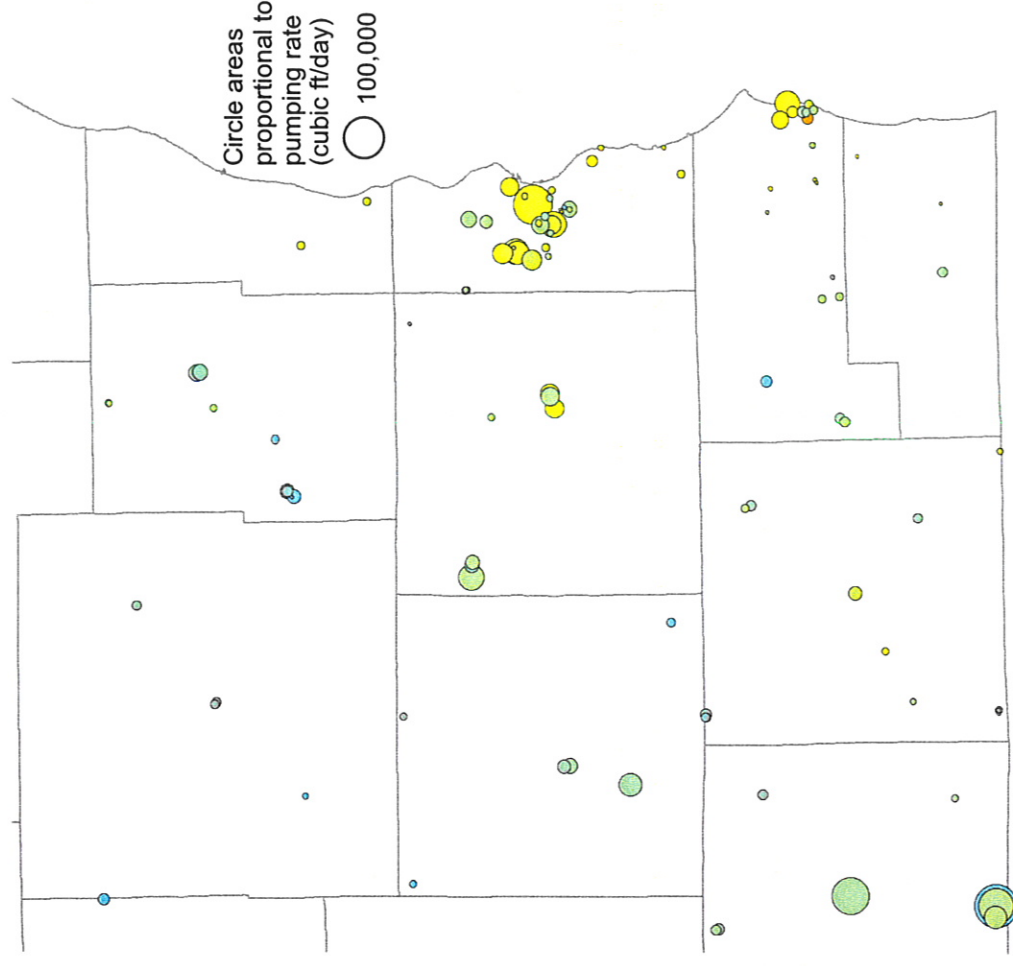


1880-1900





Water Levels in the Sandstone Aquifer  
(feet above sea level)

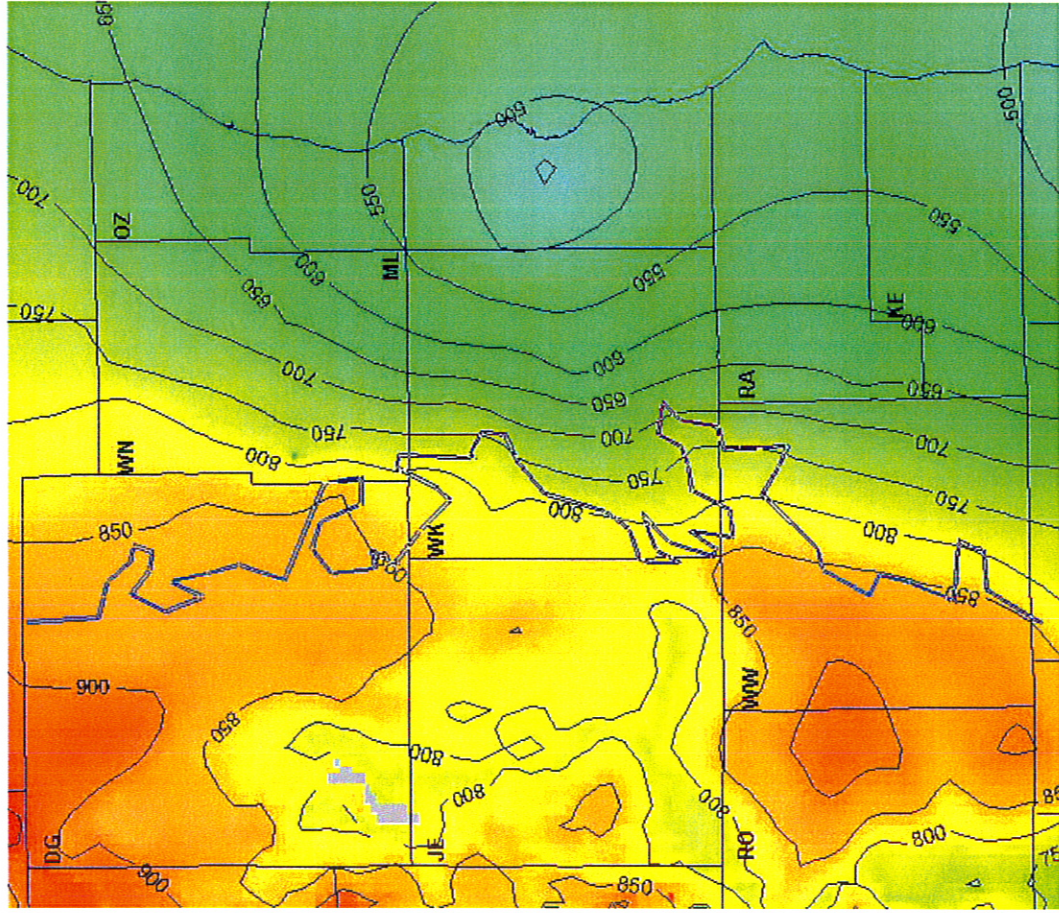


Well Locations and Pumping Rates

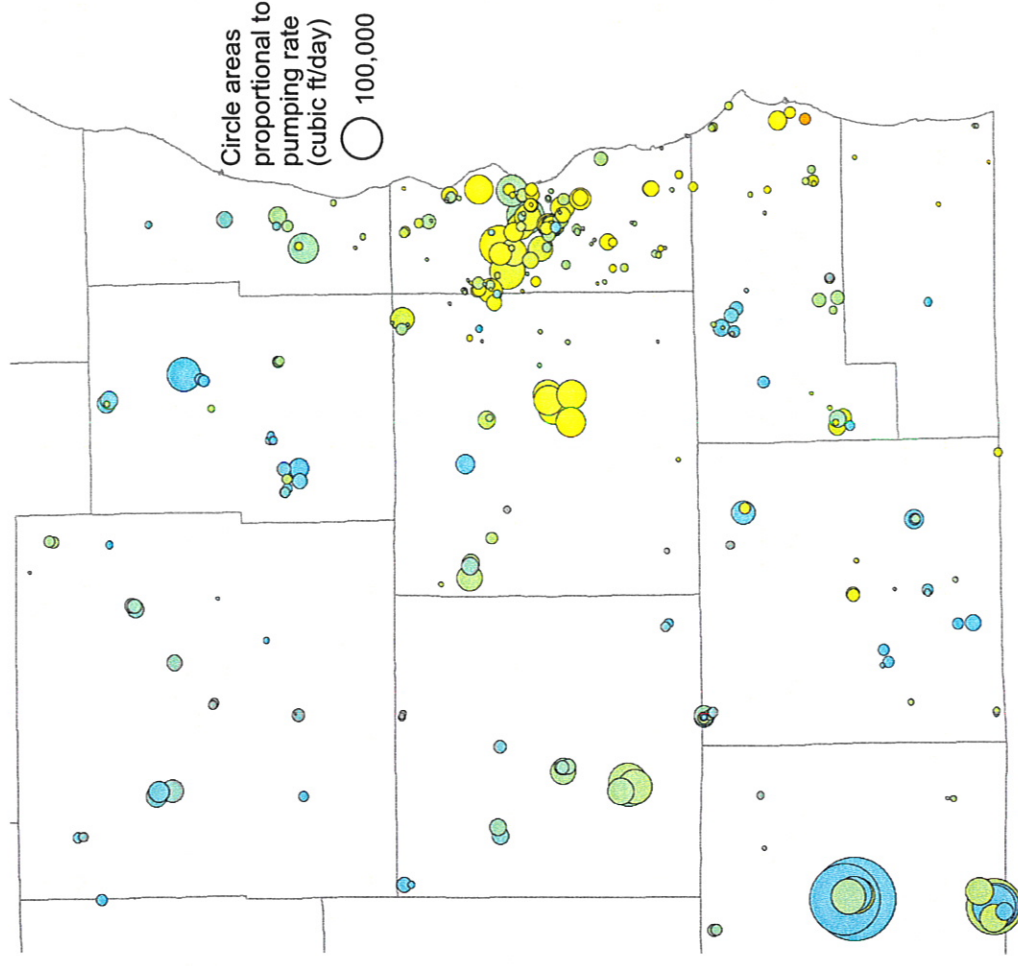
● Shallow ● Mixed or Intermediate Depth ● Deep

1920-1930





Water Levels in the Sandstone Aquifer  
(feet above sea level)

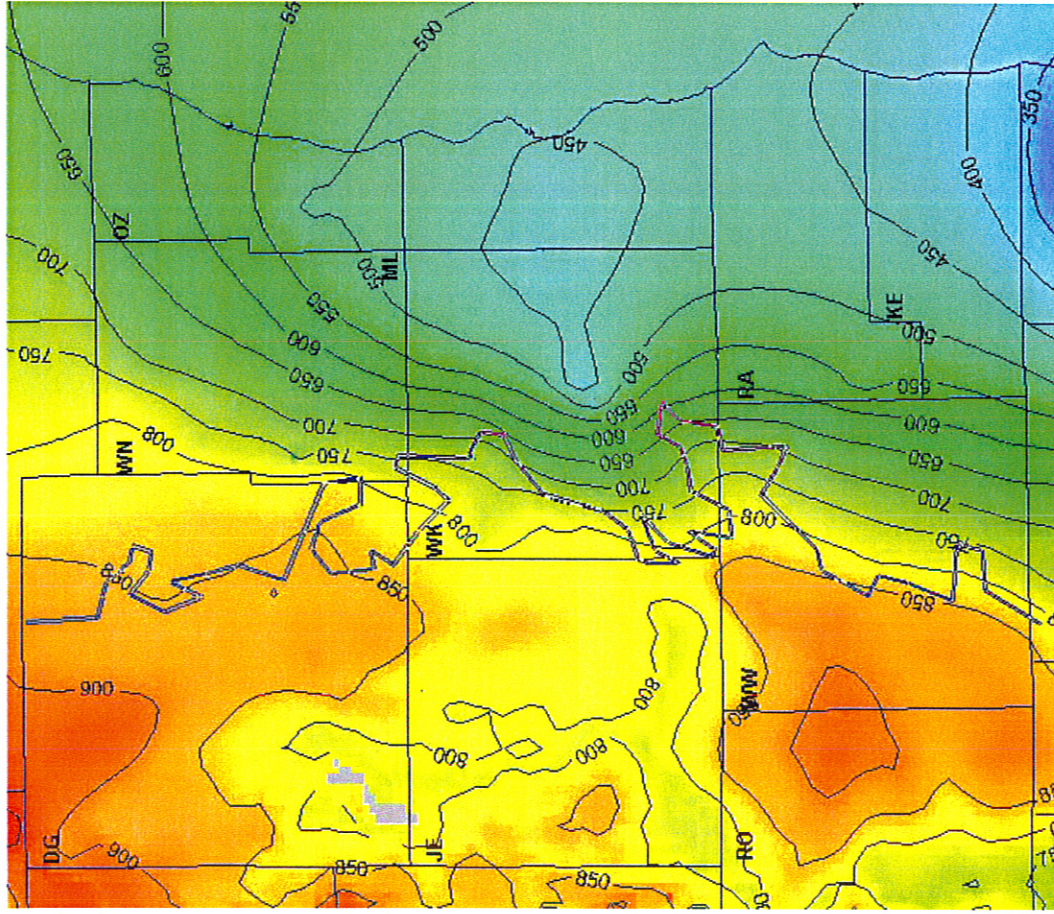


Well Locations and Pumping Rates

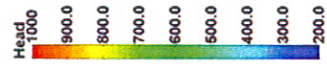
● Shallow ● Mixed or Intermediate ● Deep

1950-1961

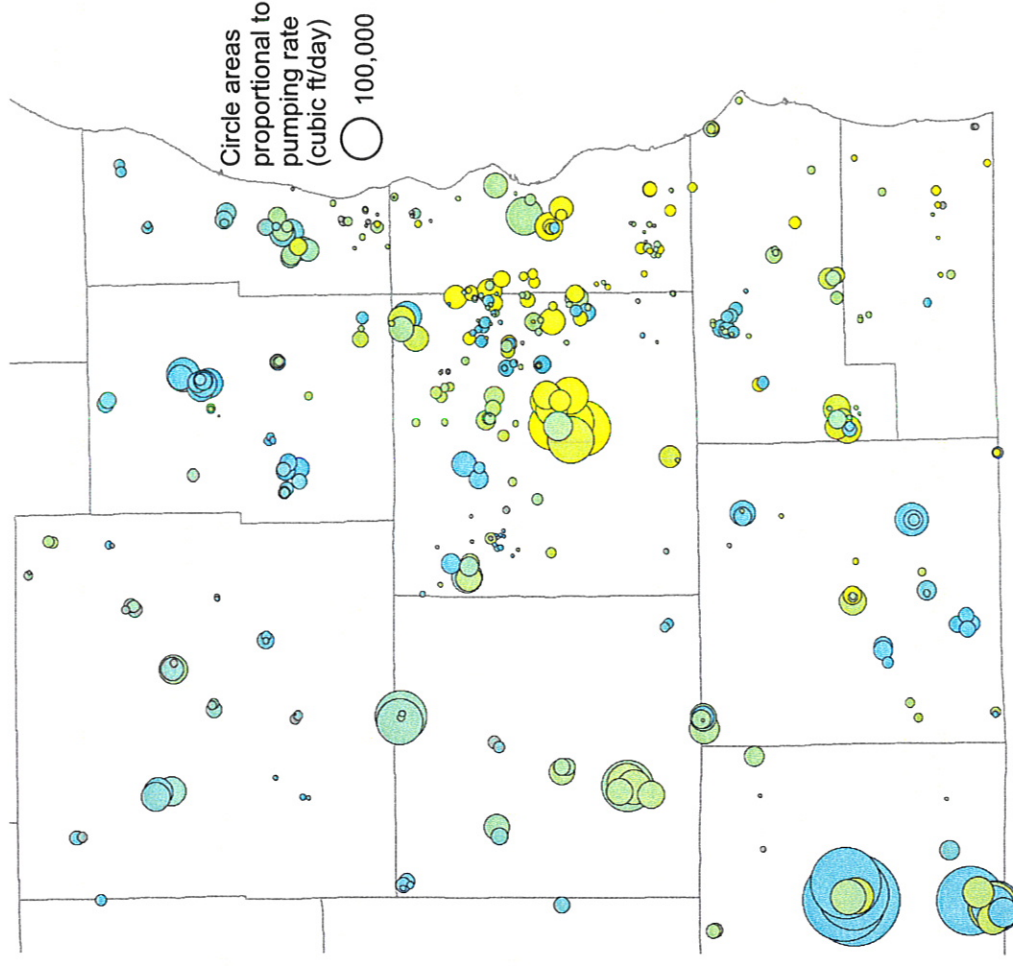




Water Levels in the Sandstone Aquifer  
(feet above sea level)

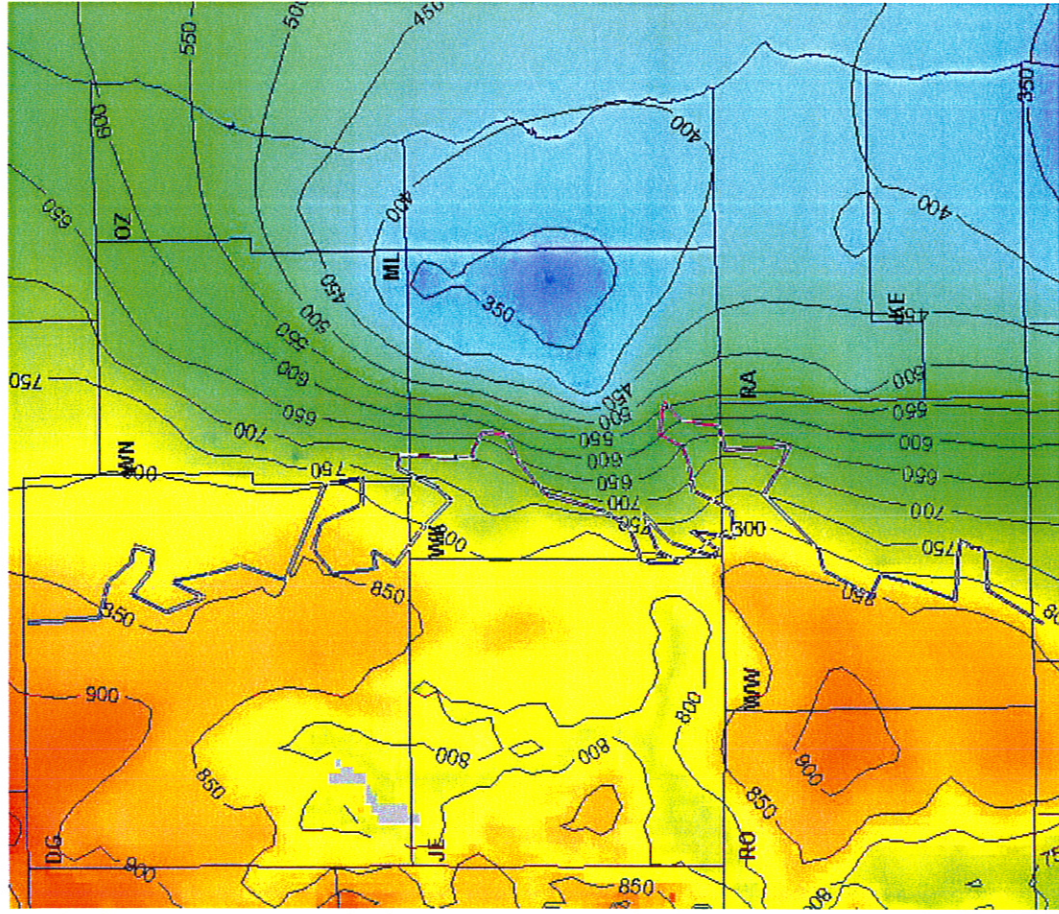


Well Locations and Pumping Rates



1970-1980



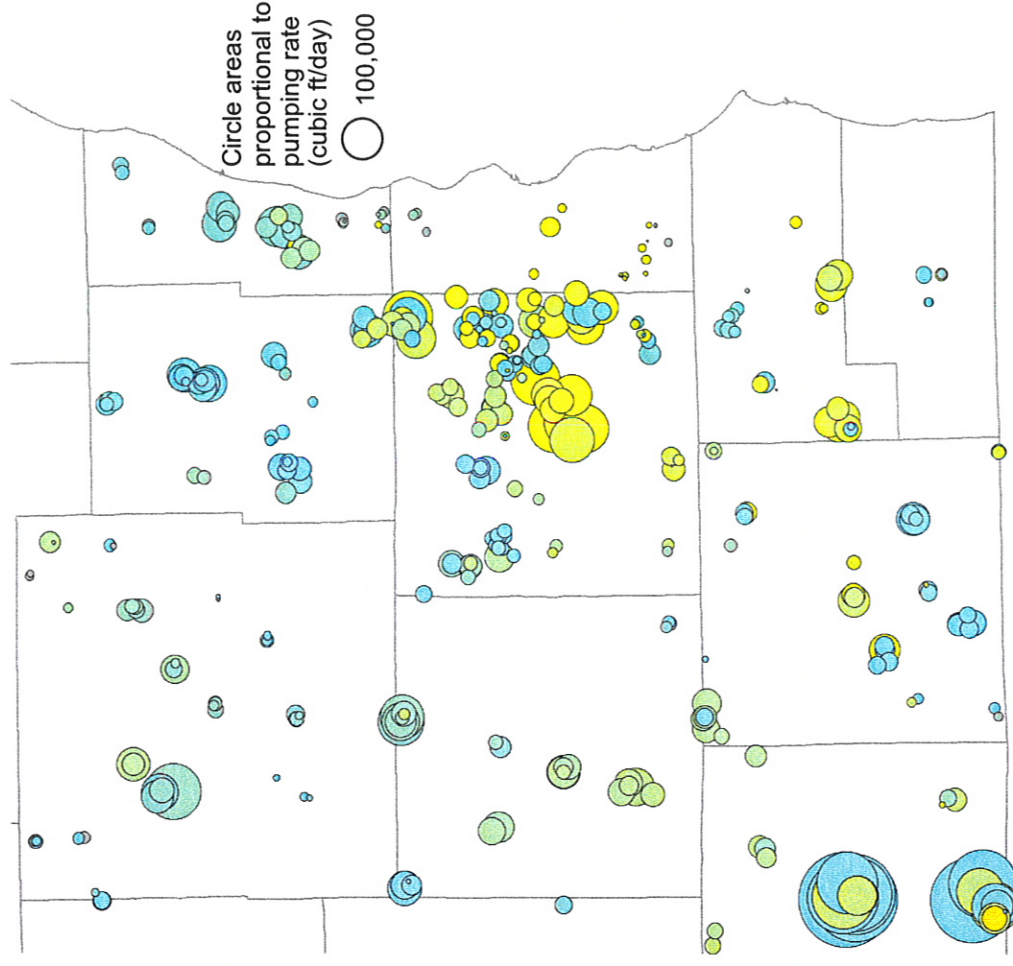


Head  
1000  
900.0  
800.0  
700.0  
600.0  
500.0  
400.0  
300.0  
200.0

Water Levels in the Sandstone Aquifer  
(feet above sea level)

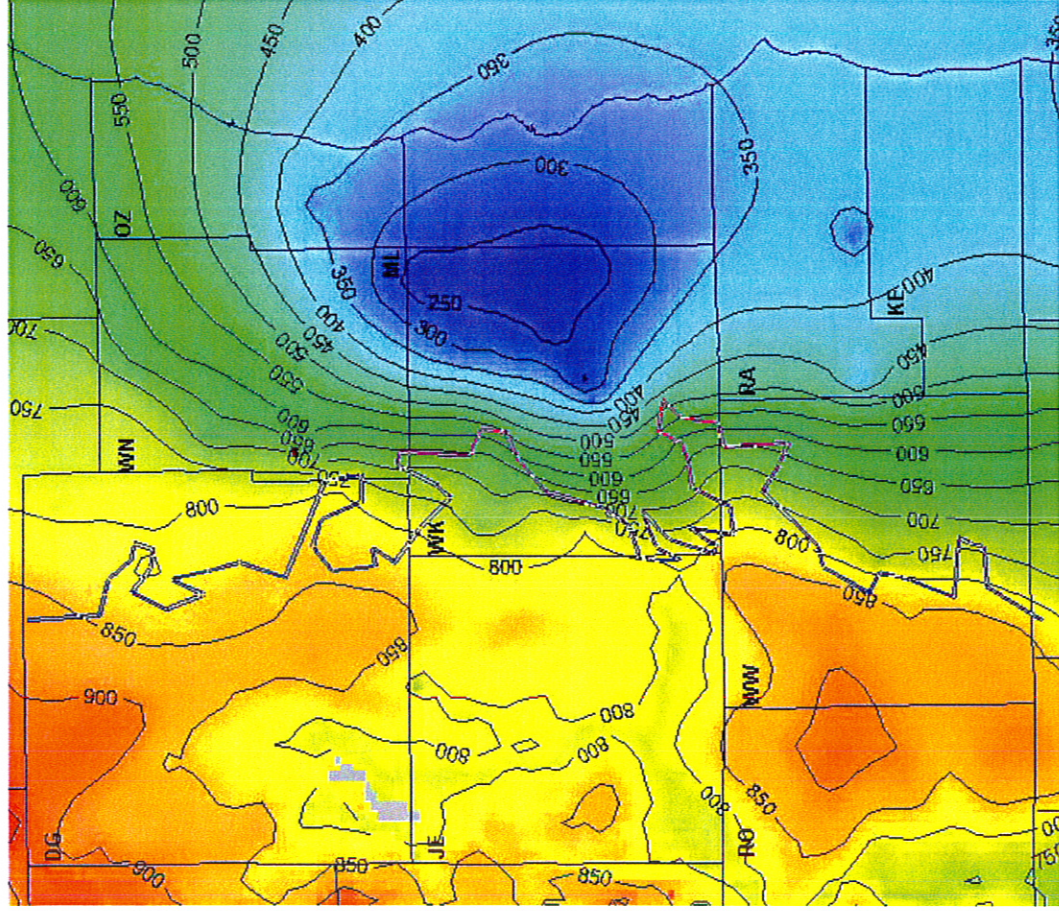
Well Locations and Pumping Rates

Shallow Mixed or Intermediate Depth Deep



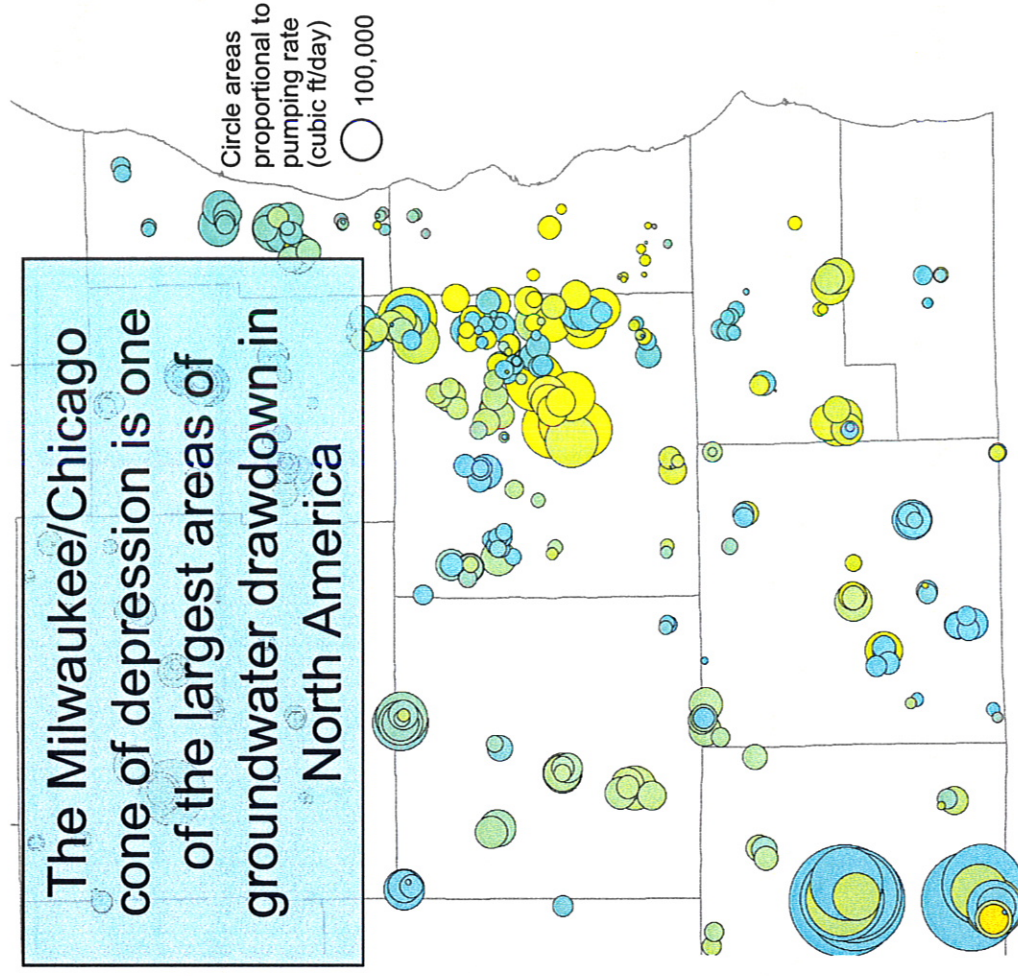
1990-2000





Water Levels in the Sandstone Aquifer  
(feet above sea level)

Well Locations and Pumping Rates  
● Shallow ● Mixed or Intermediate Depth ● Deep



The Milwaukee/Chicago cone of depression is one of the largest areas of groundwater drawdown in North America

2010-2020

# Appendix D

**Table D-1**  
**Estimated Average Day and Peak Day Water Diversion Amounts**  
**City of New Berlin, Wisconsin**

| <b>Year</b> | <b>Estimated<br/>Average Day<br/>Diversion (MGD)</b> | <b>Estimated<br/>Peak Day<br/>Diversion (MGD)</b> |
|-------------|--|---|
| 2009        | 1.890  | 2.368   |
| 2010        | 1.903  | 2.392   |
| 2011        | 1.916  | 2.415   |
| 2012        | 1.928  | 2.439   |
| 2013        | 1.941  | 2.461   |
| 2014        | 1.953  | 2.484   |
| 2015        | 1.966  | 2.506   |
| 2016        | 1.979  | 2.527   |
| 2017        | 1.991  | 2.549   |
| 2018        | 2.004  | 2.570   |
| 2019        | 2.016  | 2.591   |
| 2020        | 2.029  | 2.612   |
| 2021        | 2.042  | 2.632   |
| 2022        | 2.054  | 2.652   |
| 2023        | 2.067  | 2.672   |
| 2024        | 2.079  | 2.691   |
| 2025        | 2.092  | 2.711   |
| 2026        | 2.105  | 2.730   |
| 2027        | 2.117  | 2.749   |
| 2028        | 2.130  | 2.768   |
| 2029        | 2.142  | 2.786   |



**Figure D-1**  
**Estimated Average Day and Peak Day Water Diversion Amounts**  
**City of New Berlin, Wisconsin**

